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AUGUST 1990
QUARTERLY GROUND WATER SAMPLING RESULTS
LIVINGSTON RAIL YARD
LIVINGSTON, MONTANA

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AUGUST 1990
QUARTERLY GROUND WATER SAMPLING RESULTS
LIVINGSTON RAIL YARD
LIVINGSTON, MONTANA

Submitted To:

**Montana Department of Health
and Environmental Sciences**
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Submittal Date:

December 27, 1990



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TABLE OF CONTENTS

	<u>Page No.</u>
1.0 INTRODUCTION	1
2.0 SUMMARY	4
3.0 RESULTS AND DISCUSSION	5
3.1 Potentiometric Data and Ground Water Flow Directions	5
3.2 Water Quality	5
3.2.1 VOCs	6
3.2.1.1 The Shop Complex Area	6
3.2.1.2 The WWTP Area	12
3.2.1.3 The API Separator and Overflow Pond	12
3.2.1.4 The Cinder Pile Lagoon	13
3.2.1.5 Well L-87-7	13
3.2.2 Diesel Plume and TPH Concentrations	13
3.2.3 Semivolatile Organic Compounds	14
3.2.4 Dissolved Metals	14
3.3 Results From the Livingston Municipal Water Wells	17
4.0 QA/QC RESULTS	17
4.1 Field QA/QC	18
4.1.1 Field Duplicates	18
4.1.2 MDHES Splits	18
4.1.3 Trip Blanks	18
4.1.4 Equipment Blank	20
4.2 Laboratory QA/QC	20
4.2.1 Spiked Analyses	20
4.2.2 Laboratory Duplicate Analyses	20
4.2.3 Laboratory Surrogate Analyses	21

APPENDICES

APPENDIX A - LABORATORY ANALYSES

1.0 INTRODUCTION

Burlington Northern Railroad (BNRR), through its contractor Envirocon, Inc. (Envirocon), completed the sixth quarterly ground water sampling round at the Livingston rail yard from August 27 to August 30, 1990. A total of 37 ground water samples were taken from 34 wells. As shown on Table 1.0, this includes samples from 27 monitoring wells, 2 municipal water wells, the publicly owned treatment works (POTW) well, and 4 private water wells. The remaining samples were quality assurance/quality control (QA/QC) samples comprising three duplicates. Two trip blanks and one equipment blank were also analyzed. Figure 1.0 shows the locations of all wells sampled during the August 1990 quarterly sample round.

All ground water samples were analyzed for total petroleum hydrocarbons (TPHs) by EPA Method 418.1. All samples were analyzed for volatile organic compounds (VOCs) by EPA Method 524.2, except for two of the private well samples. These two private well samples were analyzed for dissolved metals by several EPA methods.

All analyses were performed at Energy Laboratories, Inc. (ELI) in Billings, Montana. Ten split samples taken by the Montana Department of Health and Environmental Sciences (MDHES) were analyzed at the state laboratory in Helena, Montana.

Interpretations presented in this report are necessarily based on information available at the time of publication. Interpretations may change when further data is available.

TABLE 1.0
CORRELATION OF WELLS AND SAMPLE NUMBERS
AUGUST 1990

SAMPLE NUMBER	SAMPLE LOCATION	SAMPLE METHOD	SAMPLE DATE	ANALYTICAL METHOD
140101-519	Trip Blank	-	8/27/90	524.2
-520	#1	DBP	8/27/90	524.2, 418.1
-524	#2	DBP	8/27/90	524.2, 418.1
-522	#4	DBP	8/27/90	524.2, 418.1
-523	#5	DBP	8/27/90	524.2, 418.1
-524	#7	DBP	8/27/90	524.2, 418.1
-525	L-87-7	DBP	8/27/90	524.2, 418.1
-526	#6	DBP	8/27/90	524.2, 418.1
-527	89-2	DBP	8/27/90	524.2, 418.1
-528	Dup of 89-2	DBP	8/27/90	524.2, 418.1
-529	89-11	DBP	8/27/90	524.2, 418.1
-531	89-3	DBP	8/28/90	524.2, 418.1
-532	89-9	DBP	8/28/90	524.2, 418.1
-533	L-87-8	DBP	8/28/90	524.2, 418.1
-534	L-88-13	DBP	8/28/90	524.2, 418.1
-535	POTW	Tap	8/28/90	524.2, 418.1
-536	GEYSER T.C.	Tap	8/28/90	524.2, 418.1
-537	RAINBOW M.	Dischg. Line	8/28/90	524.2, 418.1
-538	L-88-10	DBP	8/28/90	524.2, 418.1
-539	89-4	DBP	8/28/90	524.2, 418.1
-540	Dup of 89-4	DBP	8/28/90	524.2, 418.1
-541	Trip Blank	-	8/29/90	524.2
-542	L-87-8	DBP	8/29/90	524.2, 418.1
-543	L-87-4	DBP	8/29/90	524.2, 418.1

TABLE 1.0
(continued)

-544	LS-6	DBP	8/29/90	524.2, 418.1
-545	LS-10	NDBP	8/29/90	524.2, 418.1
-546	Eqpmt. Blank	Peristaltic	8/29/90	524.2
-547	#11	NDBP	8/29/90	524.2, 418.1
-548	Dup of #11	NDBP	8/29/90	524.2, 418.1
-549	B Street	Tap	8/29/90	524.2, 418.1
-550	D Street	Atmos. Dump	8/29/90	524.2, 418.1
-551	LS-8	DBP	8/29/90	524.2, 418.1
-552	L-87-3	DBP	8/29/90	524.2, 418.1
-553	LG-10	NDBP	8/30/90	524.2, 418.1
-554	89-1	NDBP	8/30/90	524.2, 418.1
-555	E. Peters	Tap	8/30/90	418.1, metals
-556	H. Thompson	Tap	8/30/90	418.1, metals
-558	90-3	DBP	8/30/90	524.2, 418.1
-559	LS-11	DBP	8/30/90	524.2, 418.1
-560	89-5	NDBP	8/30/90	418.1

2.0 SUMMARY

Ground water in the alluvial aquifer underlying the Livingston rail yard contains a plume of dissolved VOCs, a plume of diesel fuel on and above the water table, and localized concentrations of dissolved petroleum hydrocarbons. The VOC and diesel plumes emanate from separate areas on the rail yard, but their boundaries overlap.

VOCs in the aquifer are derived from more than one source on the rail yard. Possible sources are the shop complex area, Waste Water Treatment Plant (WWTP) area and associated drain lines, and the API separator and overflow pond. The largest VOC concentrations detected on the rail yard during the August 1990 quarterly sampling round were 512 parts per billion (ppb) at Well L-88-10 and 433 ppb at Well 89-3. Well L-88-10 is located on the rail yard near Park and O Streets. Well 89-3 is located at the north end of the Electric Shop. Well L-87-2, located approximately 400 feet east of the WWTP, was not sampled during the August 1990 sampling round. This well has consistently had the largest VOC concentration detected on the rail yard during previous sample rounds (1 to 2 parts per million [ppm]) and probably contained similar concentrations during August 1990.

A plume of diesel fuel is present on the water table beneath the rail lines between the main shop complex and Park Street. Apparent product thicknesses measured in the diesel plume ranged up to 1.04 feet during August 1990. The location and boundaries of the diesel plume are similar to those reported since May 1989.

Detectable concentrations of dissolved TPHs are mostly present beneath the diesel plume. Concentrations range up to 32 ppm, as found at Well L-87-8.

3.0 RESULTS AND DISCUSSION

This section presents the results and interpretation of both ground water elevation measurements and samples taken from the monitoring well network, city municipal wells, and private wells during the August 1990 quarterly sampling round.

3.1 Potentiometric Data and Ground Water Flow Directions

Water table elevations were measured at 55 points throughout the northeast half of the city of Livingston. All measurements were taken on August 27 through 30, 1990. Water table elevations and potentiometric contours are shown on Figure 1.0.

Water table elevations reveal northeast-directed ground water flow beneath the western three-quarters of the rail yard during August 1990. This flow pattern is similar to the flow directions recorded since May 1989.

Within approximately 1500 feet of the Yellowstone River, ground water flow directions vary seasonally to a greater degree than in other parts of the aquifer. Ground water flow beneath the east end of the rail yard had shifted eastward by August 1990. This shift is part of a seasonal change in ground water flow near the Yellowstone River. During spring and summer, flow is eastward into the Yellowstone River; however, when the water table drops during the fall and winter, flow shifts to a more northerly direction along the river.

3.2 Water Quality

The water quality section is separated into discussions of VOC results, the diesel plume and TPH results, and dissolved metals results.

3.2.1 VOCs

The predominant VOCs detected were the chlorinated ethenes tetrachloroethene (PCE), trichloroethene (TCE), and dichloroethene (DCE) and the chlorinated aromatic chlorobenzene. VOC concentrations in the majority of the VOC plume are less than 200 ppb. The largest concentrations, over 400 ppb, were found in the aquifer beneath the Electric Shop at Well 89-3 and downgradient of the WWTP at Well L-88-10. Monitor Well L-87-2 was mistakenly left out of the August 1990 sample round. Based on previous monthly sample results from Well L-87-2, it is likely that VOC concentrations larger than 500 ppb were present near this well during August 1990. See Tables 2.0 and 3.0 for August 1990 and previous quarterly sample results.

VOCs enter the alluvial aquifer from more than one source on the rail yard. Suspected VOC sources are the shop complex area, the WWTP area and associated drain lines, and the API separator and overflow pond area. The chlorinated ethene sources introduce different ratios of PCE, TCE, and DCE to the alluvial aquifer. Consequently, the different sources have produced a composite plume extending from the shop complex towards the Yellowstone River. Figure 2.0 shows the distribution of total chlorinated ethene concentrations (PCE, TCE, and DCE combined). The suspected sources are discussed separately in the next section.

3.2.1.1 The Shop Complex Area

The shop complex area is primarily a source of PCE to the alluvial aquifer. As shown on Table 2.0, PCE is the predominant VOC detected beneath the Electric Shop at Well 89-3 and beneath the south end of the Diesel Shop at Well 89-9. Concentrations of TCE and DCE are much smaller by comparison, and no other VOCs have been detected at these wells by Envirocon.

TABLE 2.0
COMPARISON OF QUARTERLY ANALYTICAL RESULTS - PCE

WELL NO.	PCE (ug/l)					
	MAY	AUG	NOV	FEB	MAY	AUG
1		0.62	0.65		<0.5	<0.5
2		1.3	0.55	0.51	0.66	0.52
3	0.69	0.74	0.50		<0.50	
4		<0.5		<0.5	<0.5	<0.5
5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
6	7.1	4.9	3.6	1.9	2.6	4.6
7	33	0.5	0.5	7.9	8	<0.5
8	180	126	123		148	
11		<0.5	<0.5		<0.5	<0.5
L-87-1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
L-87-2			1.7	4.9	1.7	
L-87-3	262	195	200	227	228	100
L-87-4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
L-87-5	335	367	358	238		
L-87-7		<0.5	<0.5	<0.5	<0.5	<0.5
L-87-8	58	98	86	69	16	48
L-88-9	<0.5	<0.5	<0.5	<0.5	<0.5	
L-88-10	160	155	165	177	168	127
L-88-11	<0.5	<0.5	<0.5	<0.5	<0.5	
L-88-12	255	197	250	171	150	
L-88-13	52	80	66	60	54	77
LS-6	<0.5	<0.5	<0.5		<0.5	<0.5
LS-7	<0.5	<0.5	<0.5	<0.5	<0.5	
LS-8	146	98	61	124	100	50
LS-10					<0.5	<0.5
LS-11	115	23	12	88	86	20
RAINBOW	35		64	35	24	96
DEPUY			7.2			
BURNS			<0.5			
POTW	73	46	23	68	99	40
B-STR.		**	<0.5	<0.5	<0.5	<0.5
D-STR.		<0.5			<0.5	<0.5
L-STR.	<0.5	<0.5	<0.5	<0.5	<0.5	
Q-STR.	0.66	0.95	0.71	0.5	0.76	
CLARENCE		<0.5	<0.5			
WERNER		<0.5	<0.5			
GEYSER TC				<0.5	<0.5	<0.5
LG-10				<0.5	<0.5	<0.5
89-1				10	18	<0.5
89-2				<0.5	<0.5	<0.5
89-3				272	270	430
89-4				530	530	158
89-6				28	28	
89-7				32	20	
89-8				<0.5	<0.5	
89-9					302	330
89-10					163	
89-11					<0.5	<0.5
90-1				385	480	
90-2						
90-3					76	15
90-4					<0.5	
90-5					<0.5	

TABLE 2.0 (cont'd)
COMPARISON OF QUARTERLY ANALYTICAL RESULTS - TCE

WELL NO.	TCE (ug/l)					
	MAY	AUG	NOV	FEB	MAY	AUG
1		<0.5	<0.5		<0.5	<0.5
2		<0.5	<0.5	<0.5	<0.5	<0.5
3	<0.5	<0.5	<0.5		<0.5	
4		<0.5		<0.5	<0.5	<0.5
5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
7	1.2	<0.5	<0.5	<0.5	<0.5	<0.5
8	9.9	10	5.9		9.1	
11		<0.5	<0.5		<0.5	<0.5
L-87-1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
L-87-2			24	71	29	
L-87-3	24	17	17	20	18	13
L-87-4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
L-87-5	8.7	15	10	5.1		
L-87-7		<0.5	<0.5	<0.5	<0.5	<0.5
L-87-8	7.8	11	8.8	18	4.2	18
L-88-9	<0.5	<0.5	<0.5	<0.5	<0.5	
L-88-10	31	30	26	29	28	19
L-88-11	<0.5	<0.5	<0.5	<0.5	<0.5	
L-88-12	4.9	4.5	4.1	3.8	2.7	
L-88-13	7.6	14	12	8.6	7.2	15
LS-6	<0.5	<0.5	<0.5		<0.5	<0.5
LS-7	<0.5	<0.5	<0.5	<0.5	<0.5	
LS-8	20	7.8	6.6	19	19	7.1
LS-10					<0.5	<0.5
LS-11	17	30	23	17	16	20
RAINBOW	5.2		12	6.6	4.7	15
DEPUY			1.3			
BURNS			<0.5			
POTW	6.9	2.1	0.69	4.5	8.8	1.6
B-STR.		**	<0.5	<0.5	<0.5	<0.5
D-STR.		<0.5			<0.5	<0.5
L-STR.	<0.5	<0.5	<0.5	<0.5	<0.5	
Q-STR.	<0.5	<0.5	<0.5	<0.5	<0.5	
CLARENCE		<0.5	<0.5			
WERNER		<0.5	<0.5			
GEYSER TC				<0.5	<0.5	<0.5
LG-10				<0.5	<0.5	<0.5
89-1				0.5	2.2	<0.5
89-2				<0.5	<0.5	<0.5
89-3				0.56	0.55	0.73
89-4				3.9	4.5	3.6
89-6				0.86	1	
89-7				2.5	2.8	
89-8				<0.5	<0.5	
89-9					8.3	7.9
89-10					16	
89-11					<0.5	<0.5
90-1				14	14	
90-2						
90-3					8.8	12
90-4					<0.5	
90-5					<0.5	

TABLE 2.0 (cont'd)
COMARISON OF QUARTERLY ANALYTICAL RESULTS - DCE

WELL NO.	DCE (ug/l)					
	MAY	AUG	NOV	FEB	MAY	AUG
1		<1.0	<1.0		<1.0	<1.0
2		<1.0	<1.0	<1.0	<1.0	<1.0
3	<1.0	<1.0	<1.0		<1.0	
4		<1.0		<1.0	<1.0	<1.0
5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
7	2.9	<1.0	<1.0	<1.0	1.1	<1.0
8	17	27	12		24	
11		<1.0	<1.0		<1.0	<1.0
L-87-1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
L-87-2			2571	1164	724	
L-87-3	68	56	37	94	80	21
L-87-4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
L-87-5	5.4	7.8	6.3	3.3		
L-87-7		<1.0	<1.0	<1.0	<1.0	<1.0
L-87-8	3.5	9.3	7.2	12	2.3	14
L-88-9	<1.0	<1.0	<1.0	<1.0	<1.0	
L-88-10	106	357	441	302	378	334
L-88-11	<1.0	<1.0	<1.0	<1.0	<1.0	
L-88-12	3.5	2.1	2.3	3.2	2.4	
L-88-13	6.8	24	19	9.9	9.7	34
LS-6	<1.0	<1.0	<1.0		<1.0	<1.0
LS-7	<1.0	<1.0	<1.0	<1.0	<1.0	
LS-8	84.3	21	13	131.5	128.2	15
LS-10					<1.0	<1.0
LS-11	58	122	89	81	88	108
RAINBOW	8.9		64	27	16	99
DEPUY			<1.0			
BURNS			<1.0			
POTW	9.2	5.5	<1.0	10	36	3.2
B-STR.		**	<1.0	<1.0	<1.0	<1.0
D-STR.		<1.0			<1.0	<1.0
L-STR.	<1.0	<1.0	<1.0	<1.0	<1.0	
Q-STR.	<1.0	<1.0	<1.0	<1.0	<1.0	
CLARENCE		<1.0	<1.0			
WERNER		<1.0	<1.0			
GEYSER TC				<1.0	<1.0	<1.0
LG-10				<1.0	<1.0	<1.0
89-1				<1.0	2.2	<1.0
89-2				<1.0	<1.0	<1.0
89-3				<1.0	<1.0	1.8
89-4				5.6	6.6	1.5
89-6				1.0	<1.0	
89-7				1.0	<1.0	
89-8				<1.0	<1.0	
89-9					1.9	2.1
89-10					60	
89-11					<1.0	<1.0
90-1				86	17	
90-2						
90-3					51	26
90-4					<1.0	
90-5					<1.0	

TABLE 3.0

COMPARISON OF QUARTERLY ANALYTICAL RESULTS - 2-CHLOROTOLUENE

WELL NO.	2-CHLOROTOLUENE					
	MAY	AUG	NOV	FEB	MAY	AUG
1		<1.0	<1.0		<1.0	<1.0
2		<1.0	<1.0	<1.0	<1.0	<1.0
3	<1.0	<1.0	<1.0		<1.0	
4		<1.0		<1.0	<1.0	<1.0
5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
8	<1.0	<1.0	<1.0		<1.0	
11		<1.0	<1.0		<1.0	<1.0
L-87-1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
L-87-2			78	39	67	
L-87-3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
L-87-4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
L-87-5	<1.0	<1.0	<1.0	<1.0		
L-87-7		1.1	<1.0	<1.0	<1.0	<1.0
L-87-8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
L-88-9	<1.0	<1.0	<1.0	<1.0	<1.0	
L-88-10	<1.0	3.6	3.5	1.1	<1.0	2.8
L-88-11	<1.0	<1.0	<1.0	<1.0	<1.0	
L-88-12	<1.0	<1.0	<1.0	<1.0	<1.0	
L-88-13	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
LS-6	<1.0	<1.0	<1.0		<1.0	<1.0
LS-7	<1.0	<1.0	<1.0	<1.0	<1.0	
LS-8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
LS-10					<1.0	<1.0
LS-11	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
RAINBOW	<1.0		<1.0	<1.0	<1.0	<1.0
DEPUY			<1.0			
BURNS			<1.0			
POTW	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
B-STR.		**	<1.0	<1.0	<1.0	<1.0
D-STR.		<1.0			<1.0	<1.0
L-STR.	<1.0	<1.0	<1.0	<1.0	<1.0	
Q-STR.	<1.0	<1.0	<1.0	<1.0	<1.0	
CLARENCE		<1.0	<1.0			
WERNER		<1.0	<1.0			
GEYSER TC				<1.0	<1.0	<1.0
LG-10				<1.0	<1.0	<1.0
89-1				<1.0	<1.0	<1.0
89-2				<1.0	<1.0	<1.0
89-3				<1.0	<1.0	<1.0
89-4				<1.0	<1.0	<1.0
89-6				<1.0	<1.0	
89-7				<1.0	<1.0	
89-8				<1.0	<1.0	
89-9					<1.0	<1.0
89-10					<1.0	
89-11					<1.0	<1.0
90-1				12	<1.0	
90-2						
90-3					<1.0	<1.0
90-4					<1.0	
90-5					<1.0	

TABLE 3.0 (cont'd)

COMPARISON OF QUARTERLY ANALYTICAL RESULTS- CHLOROBENZENE

WELL NO.	CHLOROBENZENE					
	MAY	AUG	NOV	FEB	MAY	AUG
1		<1.0	<1.0		<1.0	<1.0
2		<1.0	<1.0	<1.0	<1.0	<1.0
3	<1.0	<1.0	<1.0		<1.0	
4		<1.0		<1.0	<1.0	<1.0
5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
8	<1.0	<1.0	<1.0		<1.0	
11		<1.0	<1.0		<1.0	<1.0
L-87-1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
L-87-2			159	96	91	
L-87-3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
L-87-4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
L-87-5	<1.0	<1.0	<1.0	<1.0		
L-87-7		<1.0	<1.0	<1.0	<1.0	<1.0
L-87-8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
L-88-9	<1.0	<1.0	<1.0	<1.0	<1.0	
L-88-10	8.7	28	43	40	18	26
L-88-11	<1.0	<1.0	<1.0	<1.0	<1.0	
L-88-12	<1.0	<1.0	<1.0	<1.0	<1.0	
L-88-13	<1.0	3.6	1.9	<1.0	<1.0	3.7
LS-6	<1.0	<1.0	<1.0		<1.0	<1.0
LS-7	<1.0	<1.0	<1.0	<1.0	<1.0	
LS-8	27	<1.0	<1.0	69	30	<1.0
LS-10					<1.0	<1.0
LS-11	<1.0	167	305	17	7.1	230
RAINBOW	<1.0		3.5	<1.0	<1.0	1.3
DEPUY			<1.0			
BURNS			<1.0			
POTW	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
B-STR.		**	<1.0	<1.0	<1.0	<1.0
D-STR.		<1.0			<1.0	<1.0
L-STR.	<1.0	<1.0	<1.0	<1.0	<1.0	
Q-STR.	<1.0	<1.0	<1.0	<1.0	<1.0	
CLARENCE		<1.0	<1.0			
WERNER		<1.0	<1.0			
GEYSER TC				<1.0	<1.0	<1.0
LG-10				<1.0	<1.0	<1.0
89-1				<1.0	<1.0	<1.0
89-2				<1.0	<1.0	<1.0
89-3				<1.0	<1.0	<1.0
89-4				<1.0	<1.0	<1.0
89-6				<1.0	<1.0	
89-7				<1.0	<1.0	
89-8				<1.0	<1.0	
89-9					<1.0	<1.0
89-10					<1.0	
89-11					<1.0	<1.0
90-1				8.1	<1.0	
90-2						
90-3					<1.0	<1.0
90-4					<1.0	
90-5					<1.0	

The primary chlorinated ethene source in the shop complex appears to be near the west side of the Electric Shop where a traction motor vapor degreasing vat was used in the past. See Figure 2.0. Another potential source within the shop complex area is the waste water drain system. These potential sources are currently being investigated.

3.2.1.2 The WWTP Area

The WWTP area appears to be a source of DCE and chlorobenzene to the alluvial aquifer. As shown on Tables 2.0 and 3.0, concentrations of these compounds are larger in Well L-88-10 than in wells upgradient from the WWTP area. One possible VOC source in the WWTP area is the WWTP sump. Oily leachate has penetrated to the water table beneath this sump, as shown by test excavations beneath the sump during winter 1990 sludge isolation activities. The sludge from this sump is presently isolated on 40-mil VLDPE liner.

3.2.1.3 The API Separator and Overflow Pond

The API separator and overflow pond appear to be sources of DCE and chlorobenzene to the alluvial aquifer, based on sample results from Wells LS-8 and LS-11. See Tables 2.0 and 3.0. Test excavations through the base of the API separator and overflow pond during December 1989 revealed oily leachate penetrating the water table. Sludge from the API separator and overflow pond is presently isolated from the ground water by 40-mil VLDPE liner.

VOC concentrations in samples from Wells LS-8 and LS-11 have shown seasonal trends since May 1989; however, the mechanism(s) causing the fluctuations is not clearly understood. Concentration variations at Wells LS-8 and LS-11 are at least partly related to the seasonal shifts in ground water flow directions near the Yellowstone River. Another factor affecting

concentrations is the 4- to 5-foot fluctuation in the water table beneath the API separator and overflow pond. The rise during spring and summer reaches the base of these pits and may mobilize chlorinated compounds into the ground water.

Envirocon is currently investigating the area around Wells LS-8 and LS-11 to better understand the cause of seasonal VOC fluctuations.

3.2.1.4 The Cinder Pile Lagoon

The cinder pile lagoon does not appear to be a significant chlorinated ethene source to the alluvial aquifer. The VOC concentrations detected at Well L-87-3, downgradient from the cinder pile, during August 1990 are not larger than concentrations detected upgradient from the cinder pile lagoon. See Figure 2.0.

3.2.1.5 Well L-87-7

August 1990 sample results from Well L-87-7 show the presence of several typical gasoline constituents, including benzene, ethylbenzene, and o-xylene. Most previous monthly and quarterly samples from Well L-87-7 also showed the presence of these constituents. It is possible that these compounds are derived from the diesel plume; however, they have not been reported in samples from other wells within the diesel plume boundary.

3.2.2 Diesel Plume and TPH Concentrations

The shape, boundaries, and product thicknesses of the diesel plume during August 1990 are shown on Figure 3.0. The diesel plume occupies approximately the same position as it has throughout 1989 and the spring and summer of 1990. Free-product thickness at specific wells has varied slightly

as the water table rose and fell; however, the overall shape and boundaries of the plume have remained more or less constant.

As shown on Table 4.0, groundwater samples taken below the diesel plume contained the largest dissolved TPH concentrations detected during the August 1990 sample round. This is probably a result of the proximity of the dedicated sample pumps to the diesel plume.

As shown on Table 4.0, TPH concentrations for wells outside the diesel plume were all below 1 ppm, except for Well LS-6 (1.1 ppm) and Well LS-11 (1.5 ppm). The TPH concentration at Well LS-6 is related to residual diesel fuel present in the Depot area. A sheen of free product has been infrequently detected in this well. As discussed above, the area around Well LS-11 is currently being investigated to determine potential sources of TPHs.

3.2.3 Semivolatile Organic Compounds

Amendment 5.3, to the Interim Remedial Measures Work Plan (IRMWP) states in Table 5.2 that "[semivolatile organic compounds will be analyzed by EPA Method 625]...during the May 1989 and February 1990 sampling rounds with further testing based upon results." No semivolatile organic compounds were detected during either the May 1989 or February 1990 sampling rounds, so analysis for semivolatiles has been discontinued.

3.2.4 Dissolved Metals

The private residential wells of Eugene Peters and Harold Thompson were sampled for dissolved priority metals during August 1990. Both of these wells are located upgradient of the Livingston rail yard, as shown on Figure 4.0. As shown on Table 5.0, dissolved metals at these two wells were all below detection limits.

TABLE 4.0

TOTAL PETROLEUM HYDROCARBON CONCENTRATIONS

WELL NO.	TPH (mg/l)					
	MAY	AUG	NOV	FEB	MAY	AUG
1		<0.1	<0.1		<0.1	<0.1
2		<0.1	<0.1	<0.1	<0.1	<0.1
3	0.7	<0.1	<0.1		<0.1	
4		<0.1		<0.1	<0.1	<0.1
5	2.1		<0.1	<0.1	<0.1	<0.1
6	0.7	<0.1	<0.1	<0.1	<0.1	<0.1
7	0.6	0.3	<0.1	<0.1	<0.1	<0.1
8	3	<0.1	<0.1		<0.1	
11		<0.1	0.2		<0.1	<0.1
L-87-1	0.8		<0.1	<0.1	<0.1	<0.1
L-87-2			10.6	1.3	1.1	
L-87-3	0.4	<0.1	<0.1	<0.1		<0.1
L-87-4	4.4	0.3	0.9	8.1	0.8	0.9
L-87-5	0.6	<0.1	<0.5	<0.1		
L-87-7		4.2	2	19		1.5
L-87-8	14.8	0.3	2	22.8		32
L-88-9	0.7	0.1	<0.1	<0.1		
L-88-10	0.6	0.1	<0.1	<0.1		<0.1
L-88-11	0.9	0.2	<0.1	<0.1	<0.1	
L-88-12	0.7	<0.1	<0.1	0.3		
L-88-13	2	<0.1	0.3	<0.1		<0.1
LS-6	9.9	0.2	<0.1		0.3	1.1
LS-7	4.2	0.9	<0.1	0.3	<0.1	
LS-8	0.8	0.1	<0.1	0.6	<0.1	<0.1
LS-10					<0.1	<0.1
LS-11	0.5	1.7	0.4	0.1	<0.1	1.5
DEPUY			<0.1			
BURNS			<0.1			
RAINBOW			<0.1	<0.1	<0.1	0.2
POTW			<0.1	0.3	<0.1	<0.1
B-STR		**	0.1	<0.1	<0.1	<0.1
D-STR		<0.1			<0.1	<0.1
L-STR		<0.1	<0.1	<0.1	<0.1	
Q-STR		<0.1	<0.1	<0.1	<0.1	
CLARENCE		<0.1	<0.1			
WERNER		<0.1	<0.1			
GEYSER TC				<0.1		<0.1
LG-10				<0.1	<0.1	<0.1
89-1				4.5	<0.1	<0.1
89-2				<0.1	<0.1	<0.1
89-3				<0.1	<0.1	<0.1
89-4				<0.1	<0.1	<0.1
89-5						<0.1
89-6				<0.1	<0.1	
89-7				0.2	<0.1	
89-8				0.4	<0.1	
89-9					<0.1	<0.1
89-10					<0.1	
89-11					<0.1	<0.1
90-1A						
90-1B				0.4	<0.1	
90-1C						
90-2A						
90-2B						
90-3					<0.1	<0.1
90-4					<0.1	
90-5					<0.1	

TABLE 5.0**DISSOLVED METALS - AUGUST 1990**

LOCN	As mg/l	Ba mg/l	Cd mg/l	Cr mg/l	Pb mg/l	Hg mg/l	Se mg/l	Ag mg/l
E. Peters	<.005	<.1	<.001	<.02	<.01	<.001	<.005	<.005
H. Thompson	<.005	<.1	<.001	<.02	<.01	<.001	<.005	<.005

3.3 Results From the Livingston Municipal Water Wells

Samples from the B Street and D Street Wells were analyzed for VOCs and TPHs. As shown on Tables 2.0 through 6.0, no detectable concentrations of VOCs or TPHs were present in samples from the B Street or D Street Wells. This is consistent with previous sample results. The L and Q Street Wells had no available power to operate during August 1990 and could not be sampled.

4.0 QA/QC RESULTS

Envirocon followed the QA/QC program outlined in Section 10.0 of the IRMWP during the August 1990 quarterly sampling round. This program includes:

Field QA/QC

- Field duplicates
- MDHES splits
- Trip blanks
- Equipment decontamination blanks

Laboratory QA/QC

- Spiked analyses
- Laboratory duplicates
- Surrogate analyses

Field QA/QC samples were shipped "blind" to the laboratory and analyzed by the same analytical method (EPA Method 524.2) as the field samples.

4.1 Field QA/QC

Three field duplicates, ten MDHES splits, two trip blanks, and one equipment blank were used to validate field procedures.

4.1.1 Field Duplicates

Field duplicates from Wells 11 (140101-548), 89-2 (140101-528), and 89-4 (140101-540) were sent blind to ELI. As shown in Appendix A, duplicate analyses show close correlation with the original samples, indicating that field sampling, handling procedures, and laboratory procedures generated reproducible results.

4.1.2 MDHES Splits

MDHES split samples with Envirocon at Wells L-87-1 (140101-542), L-87-4 (140101-543), LS-6 (140101-544), LS-10 (140101-545), LS-10 equipment blank (140101-546), Well 11 (140101-547), B Street (140101-549), D Street (140101-550), 89-1 (141010-554), and the Peters private well (140101-555). As shown on Table 6.0, MDHES' and Envirocon's sample results match very well, indicating that August 1990 ground water sampling data is precise.

4.1.3 Trip Blanks

As shown in Appendix A, no Method 524.2 analytes were detected in either of the two trip blanks used during the August 1990 quarterly sampling round. This indicates that sample handling and shipping protocols maintained sample integrity.

TABLE 6.0

AUGUST 1990 SPLIT SAMPLE RESULTS

LOCATION	COMPOUND	MDHES	ENVIROCON
L-87-1	TPH	.06 ppm	<.1 ppm
L-87-4	TPH	1.06 ppm	.9 ppm
	ethylbenzene	.727 ppb	<1.0 ppb
	trimethylbenzene	1.189 ppb	1.3 ppb
	isopropyltoluene	.698 ppb	<1.0 ppb
	naphthalene	.665 ppb	2.1 ppb
LS-6	TPH	.85 ppm	1.1 ppm
	m+p-xylene	.649 ppb	<1.0 ppb
	isopropylbenzene	4.684 ppb	4.6 ppb
	n-propylbenzene	1.775 ppb	1.6 ppb
	trimethylbenzene	1.481 ppb	2.9 ppb
	sec-butylbenzene	5.933 ppb	5.4 ppb
	isopropyltoluene	.694 ppb	<1.0 ppb
	n-butylbenzene	6.329 ppb	<1.0 ppb
	naphthalene	.924 ppb	2.7 ppb
LS-10	TPH	.10 ppm	<.1 ppm
LS-10 Eqpmt. Blk.	TPH	.26 ppm	-
	chloroform	22.164 ppb	19 ppb
	bromodichloromethane	.656 ppb	<1.0 ppb
Well 11	TPH	.03 ppm	<.1 ppm
B Street	TPH	.07 ppm	<.1 ppm
D Street	TPH	N/D	<.1 ppm
89-1	TPH	.12 ppm	<.1 ppm
	tetrachloroethene	2.253 ppb	2.4 ppb
89-1 Duplicate	TPH	N/D	-
	tetrachloroethene	2.316 ppb	-
PETERS	Arsenic	.004 ppm	<.005 ppm
	Barium	.029 ppm	<.1 ppm
	TPH	N/D	<.1 ppm

N/D - Not detected

N/S - Not sampled

ppb - Parts per billion

ppm - Parts per million

4.1.4 Equipment Blank

One equipment blank, 140101-546, was taken through Envirocon's stainless steel bladder pump. No Method 524.2 analytes, except chloroform, were detected in the sample. This indicates that decontamination procedures are sufficient to avoid cross-contamination. Envirocon interprets the chloroform to be a result of residual chloroform in the deionized water used for equipment decontamination.

4.2 Laboratory QA/QC

ELI conducted four spiked analyses, four laboratory duplicate analyses, and 37 surrogate analyses to validate laboratory procedures. ELI's QA/QC plan is on file with MDHES.

4.2.1 Spiked Analyses

Spiked analysis was conducted on Samples 140101-520 (Well 1), 140101-534 (Well L-88-13), 140101-549 (B Street Well), and 140101-559 (Well LS-11). Results of these analyses are shown in Appendix A. The percent recoveries of the test values are all within acceptable ranges. These results indicate that ELI's laboratory equipment and procedures were acceptable.

4.2.2 Laboratory Duplicate Analyses

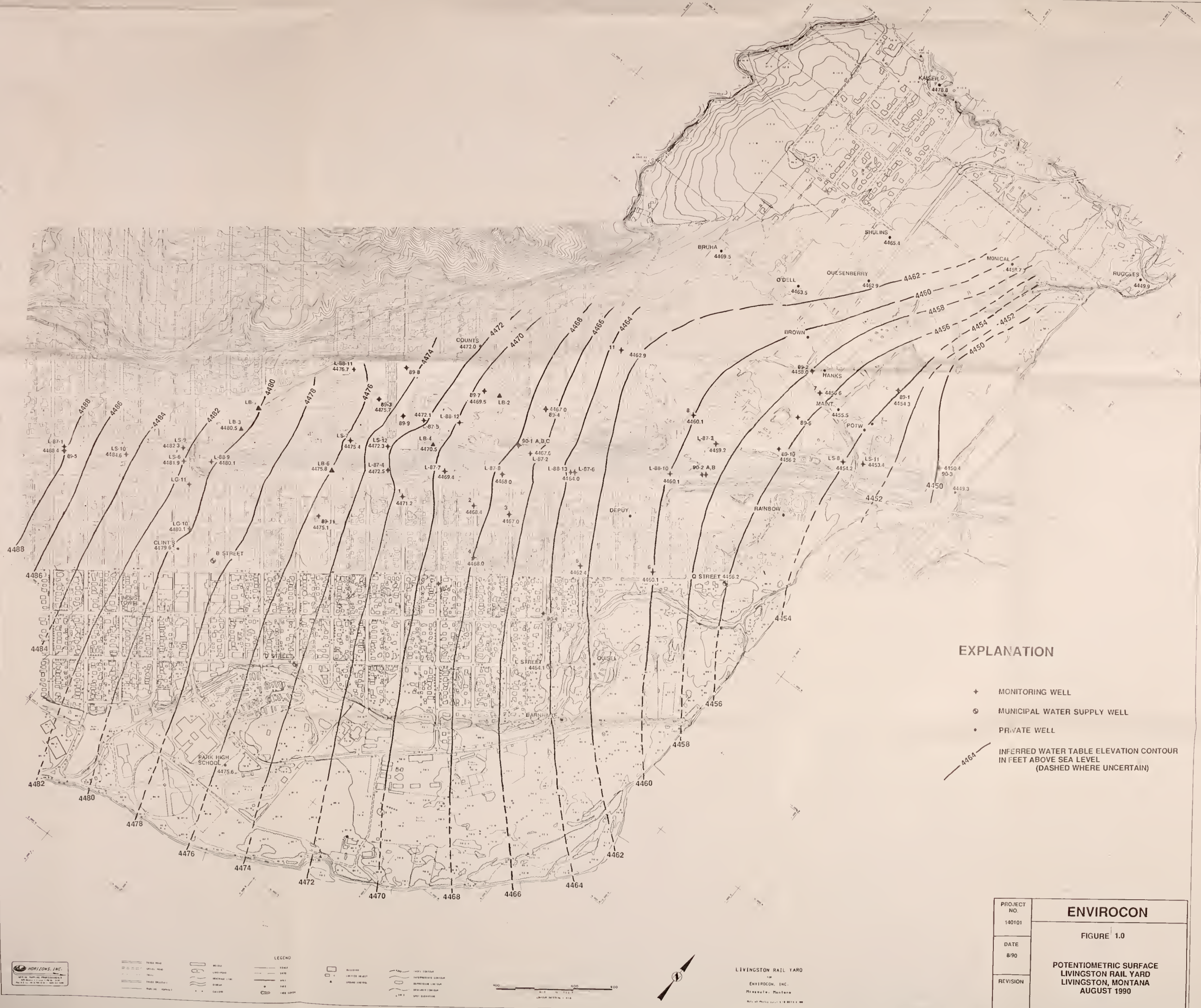
ELI performed a duplicate analysis on Samples 140101-519 (trip blank), 140101-533 (Well L-87-8), 140101-548 (Well 11), and 140101-558 (Well 90-3). As shown in Appendix A, the concentrations of VOCs reported in the duplicate analyses are very close to those reported in the original sample analyses. This indicates that laboratory equipment and procedures provided reproducible analytical results.

4.2.3 Laboratory Surrogate Analyses

Surrogate analysis was conducted on 37 samples. Results of these analyses are shown in Appendix A. The percent recoveries of the test values are all within acceptable ranges. These results indicate that ELI's laboratory equipment and procedures were adequate to provide accurate results.

FIGURE 3.0
LIVINGSTON RAILYARD
DIESEL PLUME
APPARENT THICKNESS IN FEET

PROCON





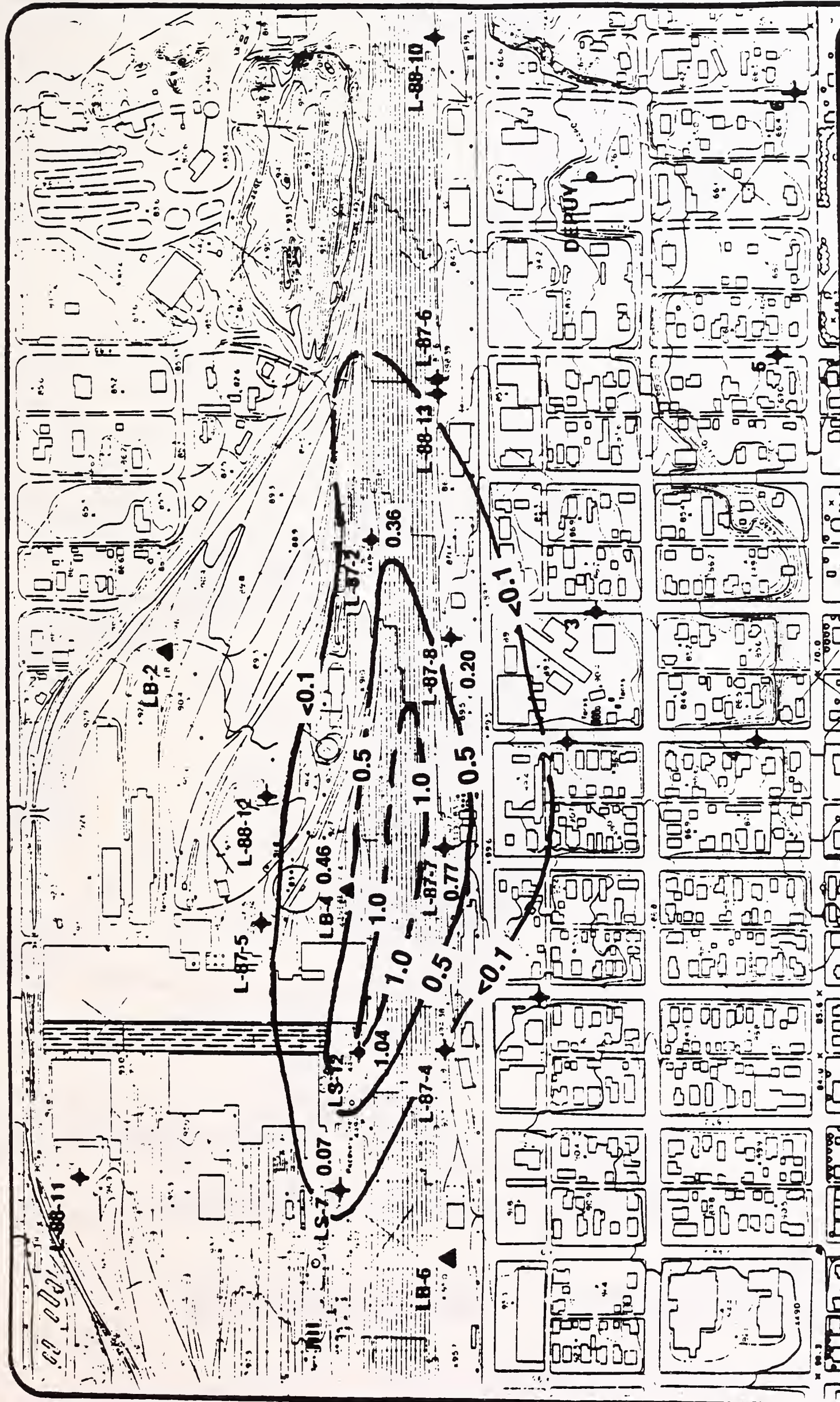
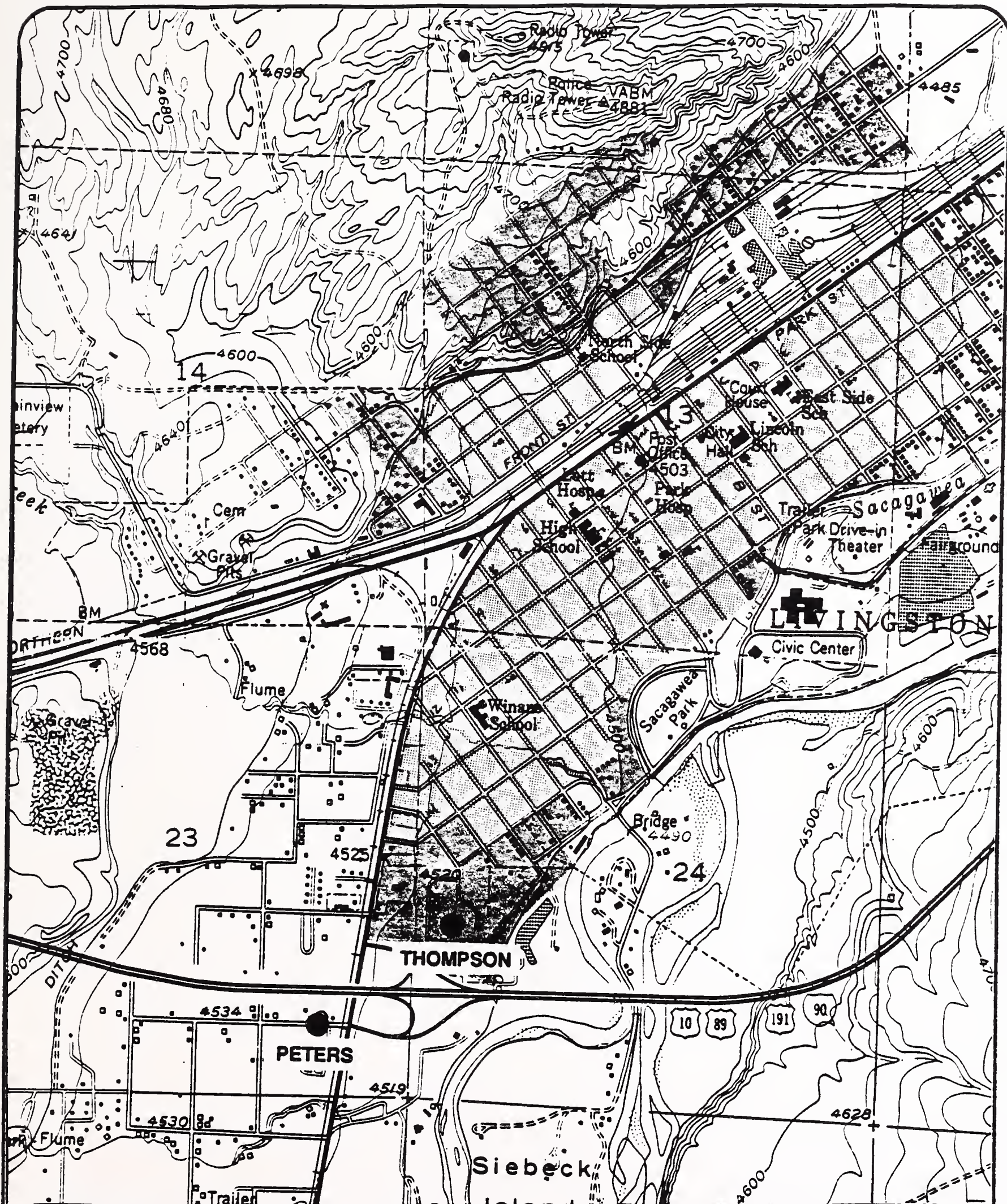


FIGURE 3.0
LIVINGSTON RAILYARD
DIESEL PLUME
APPARENT THICKNESS IN FEET

ENVIROCON		
PROJECT No	140101	
DATE	8/90	
REVISION		



PROJECT No.

DATE

REVISION

0

ENVIROCON

**FIGURE 4.0
PRIVATE UPGRADIENT WELLS
LIVINGSTON, MONTANA**

APPENDIX A

LABORATORY ANALYSES



ENERGY LABORATORIES, INC.

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6089 • 1-800-873-5227

RECEIVED SEP 20 1990

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.	90-23660-62
SAMPLE SUBMITTED	08/31/90
DATE REPORTED	09/19/90
SAMPLE DATE	08/30/90

Lab No.		Identification	Total Petroleum Hydrocarbons, mg/l
90-23660	90-3	140101-558 Sampled @ 1415	<0.1
90-23661	LS-11	140101-559 Sampled @ 1450	1.5
90-23662	89-5	140101-560 Sampled @ 1542	<0.1 ..

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE



ENERGY LABORATORIES, INC.

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-873-5227ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO. 90-23672-79
SAMPLE SUBMITTED 08/31/90
DATE REPORTED 09/18/90

Lab No.	Identification	Total Petroleum Hydrocarbons, mg/l
90-23672	140101-550 Sampled 08/29/90 @ 1700	<0.1
90-23673	140101-551 Sampled 08/29/90 @ 1800	<0.1
90-23674	140101-552 Sampled 08/29/90 @ 1845	<0.1
90-23675	140101-553 Sampled 08/30/90 @ 1000	<0.1
90-23676	140101-554 Sampled 08/30/90 @ 1135	<0.1
90-23677	140101-555 Sampled 08/30/90 @ 1600	<0.1
90-23678	140101-556 Sampled 08/30/90 @ 1645	<0.1
90-23679	140101-527 Sampled 08/27/90 @ 1750	<0.1

cc: Envirocon, Livingston

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FAX (406) 252-6069 • 1-800-873-5227

RECEIVED SEP 18 1990

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO. 90-23664-67, 69-71
SAMPLE SUBMITTED 08/31/90
DATE REPORTED 09/17/90
SAMPLE DATE 08/29/90

Lab No.	Identification	Total Petroleum Hydrocarbons, mg/l
90-23664	L-87-1 140101-542 Sampled @ 1045	<0.1
90-23665	L-87-4 140101-543 Sampled @ 1125	0.9
90-23666	LS-6 140101-544 Sampled @ 1220	1.1
90-23667	LS-10 140101-545 Sampled @ 1340	<0.1
90-23669	# 11 140101-547 Sampled @ 1553	<0.1
90-23670	# 11 140101-548 Sampled @ 1600	<0.1
90-23671	B-STREET 140101-549 Sampled @ 1635	<0.1 ✓

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PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO. 90-23548-57
SAMPLE SUBMITTED 08/30/90
DATE REPORTED 09/12/90
SAMPLE DATE 08/28/90

Lab No.	Identification	Total Petroleum Hydrocarbons, mg/l
90-23548 89-3	140101-531 Sampled @ 1135	<0.1
90-23549 89-9	140101-532 Sampled @ 1315	<0.1
90-23550 L-87-8	140101-533 Sampled @ 1455	32
90-23551 L-88-13	140101-534 Sampled @ 1535	<0.1
90-23552 POTW	140101-535 Sampled @ 1445	<0.1 ✓
90-23553 Geyer Trailer Court	140101-536 Sampled @ 1500	<0.1
90-23554 Krumholz Motel	140101-537 Sampled @ 1515	0.2
90-23555 L-88-10	140101-538 Sampled @ 1615	<0.1
90-23556 89-4	140101-539 Sampled @ 1700	<0.1
90-23557 89-4	140101-540 Sampled @ 1700	<0.1

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

2

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO. 90-23561-69
SAMPLE SUBMITTED 08/30/90
DATE REPORTED 09/12/90
SAMPLE DATE 08/27/90

Lab No.	Identification	Total Petroleum Hydrocarbons, mg/l
90-23561	#1 140101-520 Sampled @ 1230	<0.1
90-23562	#2 140101-521 Sampled @ 1315	<0.1
90-23563	#4 140101-522 Sampled @ 1345	<0.1
90-23564	#5 140101-523 Sampled @ 1425	<0.1
90-23565	#7 140101-524 Sampled @ 1525	<0.1
90-23566	L-87-7 140101-525 Sampled @ 1610	1.5
90-23567	#6 140101-526 Sampled @ 1645	<0.1
90-23568	89-2 140101-528 Sampled @ 1750	<0.1
90-23569	89-1 140101-529 Sampled @ 1855	<0.1

cc: Envirocon, Livingston
COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

Page 2

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston/BN

LAB NO.

SAMPLE IDENTIFICATION

SAMPLE SUBMITTED

DATE REPORTED

SAMPLE DATE

SAMPLE TIME

CONSTITUENT

Ethylbenzene

p-Xylene

m-Xylene

o-Xylene

Styrene

Bromoform

Isopropylbenzene

1,1,2,2-Tetrachloroethane

Bromobenzene

1,2,3-Trichloropropane

n-Propylbenzene

2-Chlorotoluene

1,3,5-Trimethylbenzene

4-Chlorotoluene

tert-Butylbenzene

1,2,4-Trimethylbenzene

sec-Butylbenzene

p-Isopropyltoluene

1,3-Dichlorobenzene

1,4-Dichlorobenzene

n-Butylbenzene

1,2-Dichlorobenzene

1,2-Dibromo-3-Chloropropane

1,2,4-Trichlorobenzene

Hexachlorobutadiene

Naphthalene

1,2,3-Trichlorobenzene

cis-1,3-Dichloropropene

trans-1,3-Dichloropropene

90-23660

140101-558

08/31/90

09/19/90

08/30/90

1415

ug/l

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<0.50

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

90-23661

140101-559

08/31/90

09/19/90

08/30/90

1450

ug/l

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

2.4

20

<1.0

1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

Duplicate

90-23660

140101-558

08/31/90

09/19/90

08/30/90

1415

ug/l

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<0.50

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

REMARKS: Sample was properly
preserved and in specified
container. Sample was analyzed
in accordance with EPA method
524.2.

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE



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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.	90-23660	90-23661	Duplicate 90-23660
SAMPLE IDENTIFICATION	140101-558	140101-559	140101-558
SAMPLE SUBMITTED	08/31/90	08/31/90	08/31/90
DATE REPORTED	09/19/90	09/19/90	09/19/90
SAMPLE DATE	08/30/90	08/30/90	08/30/90
SAMPLE TIME	1415	1450	1415
CONSTITUENT	ug/l	ug/l	ug/l
Dichlorodifluoromethane	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	1.0	<0.50
Bromomethane	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
Trichlorofluoromethane	<1.0	<1.0	<1.0
1,1-Dichloroethene	<0.50	<0.50	<0.50
Methylene Chloride	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	17	<1.0
1,1-Dichloroethane	<1.0	<1.0	<1.0
2,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	26	91	26
Chloroform	<1.0	<1.0	<1.0
Bromochloromethane	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
Carbon Tetrachloride	<0.50	<0.50	<0.50
1,1-Dichloropropene	<1.0	<1.0	<1.0
Benzene	<0.50	0.71	<0.50
1,2-Dichloroethane	<0.50	<0.50	<0.50
Trichloroethene	12	20	11
1,2-Dichloropropane	<1.0	<1.0	<1.0
Bromodichloromethane	<1.0	<1.0	<1.0
Dibromomethane	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	15	20	16
1,3-Dichloropropane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dibromoethane	<1.0	<1.0	<1.0
Chlorobenzene	<1.0	230	<1.0
1,1,1,2-Tetrachloroethane	<1.0	<1.0	<1.0

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.
SAMPLE IDENTIFICATION
SAMPLE SUBMITTED
DATE REPORTED
SAMPLE DATE
SAMPLE TIME

90-23677
140101-555
08/31/90
09/18/90
08/30/90
1600

90-23678
140101-556
08/31/90
09/18/90
08/30/90
1645

Dissolved:

mg/l

mg/l

Arsenic
Barium
Cadmium
Chromium
Lead
Mercury
Selenium
Silver

<0.005
<0.1
<0.001
<0.02
<0.01
<0.001
<0.005
<0.005

<0.005
<0.1
<0.001
<0.02
<0.01
<0.001
<0.005
<0.005

cc: Envirocon, Livingston

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PO BOX 1154
LIVINGSTON MT 59047

Water Analysis

PROJECT: Livingston / BN

LAB NO.	90-23676
SAMPLE IDENTIFICATION	140101-554
SAMPLE SUBMITTED	08/31/90
DATE REPORTED	09/18/90
REVISED DATE	11/07/90
SAMPLE DATE	08/30/90
SAMPLE TIME	1135

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Livingston, Mt.

CONSTITUENT	ug/l
Dichlorodifluoromethane	<1.0
Chloromethane	<1.0
Vinyl chloride	<0.50
Bromomethane	<1.0
Chloroethane	<1.0
Trichlorofluoromethane	<1.0
1,1-Dichloroethene	<0.50
Methylene Chloride	<1.0
trans-1,2-Dichloroethene	<1.0
1,1-Dichloroethane	<1.0
2,2-Dichloropropane	<1.0
cis-1,2-Dichloroethene	<1.0
Chloroform	<1.0
Bromochloromethane	<1.0
1,1,1-Trichloroethane	<0.50
Carbon Tetrachloride	<0.50
1,1-Dichloropropene	<1.0
Benzene	<0.50
1,2-Dichloroethane	<0.50
Trichloroethene	<0.50
1,2-Dichloropropane	<1.0
Bromodichloromethane	<1.0
Dibromomethane	<1.0
Toluene	<1.0
1,1,2-Trichloroethane	<1.0
Tetrachloroethene	2.4
1,3-Dichloropropane	<1.0
Dibromochloromethane	<1.0
1,2-Dibromoethane	<1.0
Chlorobenzene	<1.0
1,1,1,2-Tetrachloroethane	<1.0



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Page 2

ENVIROCON
PO BOX 1154
LIVINGSTON MT 59047

Water Analysis

PROJECT: Livingston/BN

LAB NO.	90-23676
SAMPLE IDENTIFICATION	140101-554
SAMPLE SUBMITTED	08/31/90
DATE REPORTED	09/18/90
REVISED DATE	11/07/90
SAMPLE DATE	08/30/90
SAMPLE TIME	1135

CONSTITUENT	ug/l
Ethylbenzene	<1.0
p-Xylene	<1.0
m-Xylene	<1.0
o-Xylene	<1.0
Styrene	<1.0
Bromoform	<1.0
Isopropylbenzene	<1.0
1,1,2,2-Tetrachloroethane	<1.0
Bromobenzene	<1.0
1,2,3-Trichloropropane	<1.0
n-Propylbenzene	<1.0
2-Chlorotoluene	<1.0
1,3,5-Trimethylbenzene	<1.0
4-Chlorotoluene	<1.0
tert-Butylbenzene	<1.0
1,2,4-Trimethylbenzene	<1.0
sec-Butylbenzene	<1.0
p-Isopropyltoluene	<1.0
1,3-Dichlorobenzene	<1.0
1,4-Dichlorobenzene	<0.50
n-Butylbenzene	<1.0
1,2-Dichlorobenzene	<1.0
1,2-Dibromo-3-Chloropropane	<1.0
1,2,4-Trichlorobenzene	<1.0
Hexachlorobutadiene	<1.0
Naphthalene	<1.0
1,2,3-Trichlorobenzene	<1.0
cis-1,3-Dichloropropene	<1.0
trans-1,3-Dichloropropene	<1.0

REMARKS: Sample was properly preserved and in specified container. Sample was analyzed in accordance with EPA method 524.2.

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ENVIROCON, Inc.
Livingston, MT.

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89-1

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

	LG-10✓	89-1✓	89-2✓
LAB NO.	90-23675	90-23676	90-23679
SAMPLE IDENTIFICATION	140101-553	140101-554	140101-527
SAMPLE SUBMITTED	08/31/90	08/31/90	08/31/90
DATE REPORTED	09/18/90	09/18/90	09/18/90
SAMPLE DATE	08/30/90	08/30/90	08/27/90
SAMPLE TIME	1000	1135	1750
CONSTITUENT	ug/l	ug/l	ug/l
Dichlorodifluoromethane	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Bromomethane	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
Trichlorofluoromethane	<1.0	<1.0	<1.0
1,1-Dichloroethene	<0.50	<0.50	<0.50
Methylene Chloride	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,1-Dichloroethane	<1.0	<1.0	<1.0
2,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0
Bromochloromethane	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
Carbon Tetrachloride	<0.50	<0.50	<0.50
1,1-Dichloropropene	<1.0	<1.0	<1.0
Benzene	<0.50	<0.50	<0.50
1,2-Dichloroethane	<0.50	<0.50	<0.50
Trichloroethene	<0.50	<0.50	<0.50
1,2-Dichloropropane	<1.0	<1.0	<1.0
Bromodichloromethane	<1.0	<1.0	<1.0
Dibromomethane	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	<0.50	<0.50	<0.50
1,3-Dichloropropane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dibromoethane	<1.0	<1.0	<1.0
Chlorobenzene	<1.0	<1.0	<1.0
1,1,1,2-Tetrachloroethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston

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Page 2

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston/BN

	LG-10	89-1	89-2
LAB NO.	90-23675	90-23676	90-23679
SAMPLE IDENTIFICATION	140101-553	140101-554	140101-527
SAMPLE SUBMITTED	08/31/90	08/31/90	08/31/90
DATE REPORTED	09/18/90	09/18/90	09/18/90
SAMPLE DATE	08/30/90	08/30/90	08/27/90
SAMPLE TIME	1000	1135	1750
CONSTITUENT	ug/l	ug/l	ug/l
Ethylbenzene	<1.0	<1.0	<1.0
p-Xylene	<1.0	<1.0	<1.0
m-Xylene	<1.0	<1.0	<1.0
o-Xylene	<1.0	<1.0	<1.0
Styrene	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Isopropylbenzene	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Bromobenzene	<1.0	<1.0	<1.0
1,2,3-Trichloropropane	<1.0	<1.0	<1.0
n-Propylbenzene	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	<1.0	<1.0	<1.0
4-Chlorotoluene	<1.0	<1.0	<1.0
tert-Butylbenzene	<1.0	<1.0	<1.0
1,2,4-Trimethylbenzene	<1.0	<1.0	<1.0
sec-Butylbenzene	<1.0	<1.0	<1.0
p-Isopropyltoluene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
n-Butylbenzene	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,2-Dibromo-3-Chloropropane	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	<1.0	<1.0	<1.0
Hexachlorobutadiene	<1.0	<1.0	<1.0
Naphthalene	<1.0	<1.0	<1.0
1,2,3-Trichlorobenzene	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0

REMARKS: Sample was properly
preserved and in specified
container. Sample was analyzed
in accordance with EPA method
524.2.

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

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Page 2

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston/BN

LAB NO.	90-23672	90-23673	90-23674
SAMPLE IDENTIFICATION	140101-550	140101-551	140101-552
SAMPLE SUBMITTED	08/31/90	08/31/90	08/31/90
DATE REPORTED	09/18/90	09/18/90	09/18/90
SAMPLE DATE	08/29/90	08/29/90	08/29/90
SAMPLE TIME	1700	1800	1845
CONSTITUENT	ug/l	ug/l	ug/l
Ethylbenzene	<1.0	<1.0	<1.0
p-Xylene	<1.0	<1.0	<1.0
m-Xylene	<1.0	<1.0	<1.0
o-Xylene	<1.0	<1.0	<1.0
Styrene	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Isopropylbenzene	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Bromobenzene	<1.0	<1.0	<1.0
1,2,3-Trichloropropane	<1.0	<1.0	<1.0
n-Propylbenzene	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	<1.0	<1.0	<1.0
4-Chlorotoluene	<1.0	<1.0	<1.0
tert-Butylbenzene	<1.0	<1.0	<1.0
1,2,4-Trimethylbenzene	<1.0	<1.0	<1.0
sec-Butylbenzene	<1.0	<1.0	<1.0
p-Isopropyltoluene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
n-Butylbenzene	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,2-Dibromo-3-Chloropropane	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	<1.0	<1.0	<1.0
Hexachlorobutadiene	<1.0	<1.0	<1.0
Naphthalene	<1.0	<1.0	<1.0
1,2,3-Trichlorobenzene	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0

REMARKS: Sample was properly
preserved and in specified
container. Sample was analyzed
in accordance with EPA method
524.2.

cc: Envirocon, Livingston

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PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.	90-23672	90-23673	90-23674
SAMPLE IDENTIFICATION	140101-550	140101-551	140101-552
SAMPLE SUBMITTED	08/31/90	08/31/90	08/31/90
DATE REPORTED	09/18/90	09/18/90	09/18/90
SAMPLE DATE	08/29/90	08/29/90	08/29/90
SAMPLE TIME	1700	1800	1845
CONSTITUENT	ug/l	ug/l	ug/l
Dichlorodifluoromethane	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Bromomethane	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
Trichlorofluoromethane	<1.0	<1.0	<1.0
1,1-Dichloroethene	<0.50	<0.50	<0.50
Methylene Chloride	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,1-Dichloroethane	<1.0	<1.0	<1.0
2,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	<1.0	15	21
Chloroform	<1.0	<1.0	<1.0
Bromochloromethane	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
Carbon Tetrachloride	<0.50	<0.50	<0.50
1,1-Dichloropropene	<1.0	<1.0	<1.0
Benzene	<0.50	<0.50	<0.50
1,2-Dichloroethane	<0.50	<0.50	<0.50
Trichloroethene	<0.50	7.1	13
1,2-Dichloropropane	<1.0	<1.0	<1.0
Bromodichloromethane	<1.0	<1.0	<1.0
Dibromomethane	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	<0.50	50	100
1,3-Dichloropropane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dibromoethane	<1.0	<1.0	<1.0
Chlorobenzene	<1.0	<1.0	<1.0
1,1,1,2-Tetrachloroethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE



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PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.	90-23669	90-23670	90-23671
SAMPLE IDENTIFICATION	140101-547	140101-548	140101-549
SAMPLE SUBMITTED	08/31/90	08/31/90	08/31/90
DATE REPORTED	09/17/90	09/17/90	09/17/90
SAMPLE DATE	08/29/90	08/29/90	08/29/90
SAMPLE TIME	1553	1600	1635

CONSTITUENT	ug/l	ug/l	ug/l
Dichlorodifluoromethane	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Bromomethane	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
Trichlorofluoromethane	<1.0	<1.0	<1.0
1,1-Dichloroethene	<0.50	<0.50	<0.50
Methylene Chloride	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,1-Dichloroethane	<1.0	<1.0	<1.0
2,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0
Bromochloromethane	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
Carbon Tetrachloride	<0.50	<0.50	<0.50
1,1-Dichloropropene	<1.0	<1.0	<1.0
Benzene	<0.50	<0.50	<0.50
1,2-Dichloroethane	<0.50	<0.50	<0.50
Trichloroethene	<0.50	<0.50	<0.50
1,2-Dichloropropane	<1.0	<1.0	<1.0
Bromodichloromethane	<1.0	<1.0	<1.0
Dibromomethane	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	<0.50	<0.50	<0.50
1,3-Dichloropropane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dibromoethane	<1.0	<1.0	<1.0
Chlorobenzene	<1.0	<1.0	<1.0
1,1,1,2-Tetrachloroethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

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RECEIVED SEP 18 1990

Page 2

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston/BN

LAB NO.	90-23669	90-23670	90-23671
SAMPLE IDENTIFICATION	140101-547	140101-548	140101-549
SAMPLE SUBMITTED	08/31/90	08/31/90	08/31/90
DATE REPORTED	09/17/90	09/17/90	09/17/90
SAMPLE DATE	08/29/90	08/29/90	08/29/90
SAMPLE TIME	1553	1600	1635

CONSTITUENT	ug/l	ug/l	ug/l
Ethylbenzene	<1.0	<1.0	<1.0
p-Xylene	<1.0	<1.0	<1.0
m-Xylene	<1.0	<1.0	<1.0
o-Xylene	<1.0	<1.0	<1.0
Styrene	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Isopropylbenzene	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Bromobenzene	<1.0	<1.0	<1.0
1,2,3-Trichloropropane	<1.0	<1.0	<1.0
n-Propylbenzene	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	<1.0	<1.0	<1.0
4-Chlorotoluene	<1.0	<1.0	<1.0
tert-Butylbenzene	<1.0	<1.0	<1.0
1,2,4-Trimethylbenzene	<1.0	<1.0	<1.0
sec-Butylbenzene	<1.0	<1.0	<1.0
p-Isopropyltoluene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
n-Butylbenzene	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,2-Dibromo-3-Chloropropane	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	<1.0	<1.0	<1.0
Hexachlorobutadiene	<1.0	<1.0	<1.0
Naphthalene	<1.0	<1.0	<1.0
1,2,3-Trichlorobenzene	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0

REMARKS: Sample was properly
preserved and in specified
container. Sample was analyzed
in accordance with EPA method
524.2.

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE



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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO. 90-23670
SAMPLE IDENTIFICATION 140101-548
SAMPLE SUBMITTED 08/31/90
DATE REPORTED 09/17/90
SAMPLE DATE 08/29/90
SAMPLE TIME 1600

CONSTITUENT ug/l

Dichlorodifluoromethane	<1.0
Chloromethane	<1.0
Vinyl chloride	<0.50
Bromomethane	<1.0
Chloroethane	<1.0
Trichlorofluoromethane	<1.0
1,1-Dichloroethene	<0.50
Methylene Chloride	<1.0
trans-1,2-Dichloroethene	<1.0
1,1-Dichloroethane	<1.0
2,2-Dichloropropane	<1.0
cis-1,2-Dichloroethene	<1.0
Chloroform	<1.0
Bromochloromethane	<1.0
1,1,1-Trichloroethane	<0.50
Carbon Tetrachloride	<0.50
1,1-Dichloropropene	<1.0
Benzene	<0.50
1,2-Dichloroethane	<0.50
Trichloroethene	<0.50
1,2-Dichloropropane	<1.0
Bromodichloromethane	<1.0
Dibromomethane	<1.0
Toluene	<1.0
1,1,2-Trichloroethane	<1.0
Tetrachloroethene	<0.50
1,3-Dichloropropane	<1.0
Dibromochloromethane	<1.0
1,2-Dibromoethane	<1.0
Chlorobenzene	<1.0
1,1,1,2-Tetrachloroethane	<1.0

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

Page 2

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston/BN

LAB NO.	Duplicate
SAMPLE IDENTIFICATION	90-23670
SAMPLE SUBMITTED	140101-548
DATE REPORTED	08/31/90
SAMPLE DATE	09/17/90
SAMPLE TIME	08/29/90
	1600

CONSTITUENT	ug/l
Ethylbenzene	<1.0
p-Xylene	<1.0
m-Xylene	<1.0
o-Xylene	<1.0
Styrene	<1.0
Bromoform	<1.0
Isopropylbenzene	<1.0
1,1,2,2-Tetrachloroethane	<1.0
Bromobenzene	<1.0
1,2,3-Trichloropropane	<1.0
n-Propylbenzene	<1.0
2-Chlorotoluene	<1.0
1,3,5-Trimethylbenzene	<1.0
4-Chlorotoluene	<1.0
tert-Butylbenzene	<1.0
1,2,4-Trimethylbenzene	<1.0
sec-Butylbenzene	<1.0
p-Isopropyltoluene	<1.0
1,3-Dichlorobenzene	<1.0
1,4-Dichlorobenzene	<0.50
n-Butylbenzene	<1.0
1,2-Dichlorobenzene	<1.0
1,2-Dibromo-3-Chloropropane	<1.0
1,2,4-Trichlorobenzene	<1.0
Hexachlorobutadiene	<1.0
Naphthalene	<1.0
1,2,3-Trichlorobenzene	<1.0
cis-1,3-Dichloropropene	<1.0
trans-1,3-Dichloropropene	<1.0

REMARKS: Sample was properly
preserved and in specified
container. Sample was analyzed
in accordance with EPA method
524.2.

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

RECEIVED SEP 13 1990

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.	90-23666	90-23667	90-23668
SAMPLE IDENTIFICATION	140101-544	140101-545	140101-546
SAMPLE SUBMITTED	08/31/90	08/31/90	08/31/90
DATE REPORTED	09/17/90	09/17/90	09/17/90
SAMPLE DATE	08/29/90	08/29/90	08/29/90
SAMPLE TIME	1220	1340	1350

CONSTITUENT	ug/l	ug/l	ug/l
Dichlorodifluoromethane	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Bromomethane	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
Trichlorofluoromethane	<1.0	<1.0	<1.0
1,1-Dichloroethene	<0.50	<0.50	<0.50
Methylene Chloride	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,1-Dichloroethane	<1.0	<1.0	<1.0
2,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0
Chloroform	<1.0	<1.0	19
Bromochloromethane	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
Carbon Tetrachloride	<0.50	<0.50	<0.50
1,1-Dichloropropene	<1.0	<1.0	<1.0
Benzene	<0.50	<0.50	<0.50
1,2-Dichloroethane	<0.50	<0.50	<0.50
Trichloroethene	<0.50	<0.50	<0.50
1,2-Dichloropropane	<1.0	<1.0	<1.0
Bromodichloromethane	<1.0	<1.0	<1.0
Dibromomethane	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	<0.50	<0.50	<0.50
1,3-Dichloropropane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dibromoethane	<1.0	<1.0	<1.0
Chlorobenzene	<1.0	<1.0	<1.0
1,1,1,2-Tetrachloroethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

Page 2

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston/BN

LAB NO.	90-23666	90-23667	90-23668
SAMPLE IDENTIFICATION	140101-544	140101-545	140101-546
SAMPLE SUBMITTED	08/31/90	08/31/90	08/31/90
DATE REPORTED	09/17/90	09/17/90	09/17/90
SAMPLE DATE	08/29/90	08/29/90	08/29/90
SAMPLE TIME	1220	1340	1350
CONSTITUENT	ug/l	ug/l	ug/l
Ethylbenzene	<1.0	<1.0	<1.0
p-Xylene	<1.0	<1.0	<1.0
m-Xylene	<1.0	<1.0	<1.0
o-Xylene	<1.0	<1.0	<1.0
Styrene	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Isopropylbenzene	4.6	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Bromobenzene	<1.0	<1.0	<1.0
1,2,3-Trichloropropane	<1.0	<1.0	<1.0
n-Propylbenzene	1.6	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	1.1	<1.0	<1.0
4-Chlorotoluene	<1.0	<1.0	<1.0
tert-Butylbenzene	<1.0	<1.0	<1.0
1,2,4-Trimethylbenzene	1.8	<1.0	<1.0
sec-Butylbenzene	5.4	<1.0	<1.0
p-Isopropyltoluene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
n-Butylbenzene	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,2-Dibromo-3-Chloropropane	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	<1.0	<1.0	<1.0
Hexachlorobutadiene	<1.0	<1.0	<1.0
Naphthalene	2.7	<1.0	<1.0
1,2,3-Trichlorobenzene	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0

REMARKS: Sample was properly
preserved and in specified
container. Sample was analyzed
in accordance with EPA method
524.2.

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.	90-23663	90-23664	90-23665
SAMPLE IDENTIFICATION	140101-541	140101-542	140101-543
SAMPLE SUBMITTED	08/31/90	08/31/90	08/31/90
DATE REPORTED	09/17/90	09/17/90	09/17/90
SAMPLE DATE	08/29/90	08/29/90	08/29/90
SAMPLE TIME	0920	1045	1125
CONSTITUENT	ug/l	ug/l	ug/l
Dichlorodifluoromethane	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Bromomethane	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
Trichlorofluoromethane	<1.0	<1.0	<1.0
1,1-Dichloroethene	<0.50	<0.50	<0.50
Methylene Chloride	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,1-Dichloroethane	<1.0	<1.0	<1.0
2,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0
Bromochloromethane	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
Carbon Tetrachloride	<0.50	<0.50	<0.50
1,1-Dichloropropene	<1.0	<1.0	<1.0
Benzene	<0.50	<0.50	<0.50
1,2-Dichloroethane	<0.50	<0.50	<0.50
Trichloroethene	<0.50	<0.50	<0.50
1,2-Dichloropropane	<1.0	<1.0	<1.0
Bromodichloromethane	<1.0	<1.0	<1.0
Dibromomethane	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	<0.50	<0.50	<0.50
1,3-Dichloropropane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dibromoethane	<1.0	<1.0	<1.0
Chlorobenzene	<1.0	<1.0	<1.0
1,1,1,2-Tetrachloroethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

Page 2

ENVIROCON
PO BOX 8243
MISSOULA MT 59307

Water Analysis

PROJECT: Livingston/BN

LAB NO.	90-23663	90-23664	90-23665
SAMPLE IDENTIFICATION	140101-541	140101-542	140101-543
SAMPLE SUBMITTED	08/31/90	08/31/90	08/31/90
DATE REPORTED	09/17/90	09/17/90	09/17/90
SAMPLE DATE	08/29/90	08/29/90	08/29/90
SAMPLE TIME	0920	1045	1125

CONSTITUENT	ug/l	ug/l	ug/l
Ethylbenzene	<1.0	<1.0	<1.0
p-Xylene	<1.0	<1.0	<1.0
m-Xylene	<1.0	<1.0	<1.0
o-Xylene	<1.0	<1.0	<1.0
Styrene	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Isopropylbenzene	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Bromobenzene	<1.0	<1.0	<1.0
1,2,3-Trichloropropane	<1.0	<1.0	<1.0
n-Propylbenzene	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	<1.0	<1.0	<1.0
4-Chlorotoluene	<1.0	<1.0	<1.0
tert-Butylbenzene	<1.0	<1.0	<1.0
1,2,4-Trimethylbenzene	<1.0	<1.0	1.3
sec-Butylbenzene	<1.0	<1.0	<1.0
p-Isopropyltoluene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
n-Butylbenzene	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,2-Dibromo-3-Chloropropane	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	<1.0	<1.0	<1.0
Hexachlorobutadiene	<1.0	<1.0	<1.0
Naphthalene	<1.0	<1.0	2.1
1,2,3-Trichlorobenzene	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0

REMARKS: Sample was properly
preserved and in specified
container. Sample was analyzed
in accordance with EPA method
524.2.

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

Page 2

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston/BN

LAB NO.

SAMPLE IDENTIFICATION

SAMPLE SUBMITTED

DATE REPORTED

SAMPLE DATE

SAMPLE TIME

CONSTITUENT

Ethylbenzene

p-Xylene

m-Xylene

o-Xylene

Styrene

Bromoform

Isopropylbenzene

1,1,2,2-Tetrachloroethane

Bromobenzene

1,2,3-Trichloropropane

n-Propylbenzene

2-Chlorotoluene

1,3,5-Trimethylbenzene

4-Chlorotoluene

tert-Butylbenzene

1,2,4-Trimethylbenzene

sec-Butylbenzene

p-Isopropyltoluene

1,3-Dichlorobenzene

1,4-Dichlorobenzene

n-Butylbenzene

1,2-Dichlorobenzene

1,2-Dibromo-3-Chloropropane

1,2,4-Trichlorobenzene

Hexachlorobutadiene

Naphthalene

1,2,3-Trichlorobenzene

cis-1,3-Dichloropropene

trans-1,3-Dichloropropene

7-8-90
89-4

L-87-8

Duplicate

90-23550

90-23557

140101-540

140101-533

08/30/90

08/30/90

09/12/90

09/12/90

08/28/90

08/28/90

1700

1455

ug/l

ug/l

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

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<1.0

<1.0

<0.50

<0.50

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<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

<1.0

REMARKS: Sample was properly
preserved and in specified
container. Sample was analyzed
in accordance with EPA method
524.2.

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

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FAX (406) 252-8069 • 1-800-873-5227ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.
SAMPLE IDENTIFICATION
SAMPLE SUBMITTED
DATE REPORTED
SAMPLE DATE
SAMPLE TIME90-23557
140101-540
08/30/90
09/12/90
08/28/90
1700*89-4*
87-8
Duplicate
90-23550
140101-533
08/30/90
09/12/90
08/28/90
1455

CONSTITUENT

ug/l

ug/l

Dichlorodifluoromethane
Chloromethane
Vinyl chloride
Bromomethane
Chloroethane
Trichlorofluoromethane
1,1-Dichloroethene
Methylene Chloride
trans-1,2-Dichloroethene
1,1-Dichloroethane
2,2-Dichloropropane
cis-1,2-Dichloroethene
Chloroform
Bromochloromethane
1,1,1-Trichloroethane
Carbon Tetrachloride
1,1-Dichloropropene
Benzene
1,2-Dichloroethane
Trichloroethene
1,2-Dichloropropane
Bromodichloromethane
Dibromomethane
Toluene
1,1,2-Trichloroethane
Tetrachloroethene
1,3-Dichloropropane
Dibromochloromethane
1,2-Dibromoethane
Chlorobenzene
1,1,1,2-Tetrachloroethane<1.0
<1.0
<0.50
<1.0
<1.0
<1.0
<0.50
<1.0
<1.0
<1.0
<1.0
1.2
<1.0
<1.0
<0.50
<0.50
<1.0
<0.50
<0.50
3.4
<1.0
<1.0
<1.0
<1.0
153
<1.0
<1.0
<1.0
<1.0
<1.0<1.0
<1.0
<0.50
<1.0
<1.0
<1.0
<0.50
<1.0
<1.0
<1.0
14
<1.0
<1.0
<0.50
<0.50
17
<1.0
<1.0
<1.0
<1.0
44
<1.0
<1.0
<1.0
<1.0
<1.0

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.	90-23554	90-23555	90-23556
SAMPLE IDENTIFICATION	140101-537	140101-538	140101-539
SAMPLE SUBMITTED	08/30/90	08/30/90	08/30/90
DATE REPORTED	09/12/90	09/12/90	09/12/90
SAMPLE DATE	08/28/90	08/28/90	08/28/90
SAMPLE TIME	1515	1615	1700
CONSTITUENT	ug/l	ug/l	ug/l
Dichlorodifluoromethane	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Bromomethane	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
Trichlorofluoromethane	<1.0	<1.0	<1.0
1,1-Dichloroethene	<0.50	<0.50	<0.50
Methylene Chloride	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	3.6	<1.0
1,1-Dichloroethane	<1.0	<1.0	<1.0
2,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	99	330	1.5
Chloroform	<1.0	<1.0	<1.0
Bromochloromethane	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
Carbon Tetrachloride	<0.50	<0.50	<0.50
1,1-Dichloropropene	<1.0	<1.0	<1.0
Benzene	<0.50	<0.50	<0.50
1,2-Dichloroethane	<0.50	<0.50	<0.50
Trichloroethene	15	19	3.6
1,2-Dichloropropane	<1.0	<1.0	<1.0
Bromodichloromethane	<1.0	<1.0	<1.0
Dibromomethane	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	96	127	158
1,3-Dichloropropane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dibromoethane	<1.0	<1.0	<1.0
Chlorobenzene	1.3	26	<1.0
1,1,1,2-Tetrachloroethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

Page 2

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston/BN

LAB NO.	90-23554	90-23555	90-23556
SAMPLE IDENTIFICATION	140101-537	140101-538	140101-539
SAMPLE SUBMITTED	08/30/90	08/30/90	08/30/90
DATE REPORTED	09/12/90	09/12/90	09/12/90
SAMPLE DATE	08/28/90	08/28/90	08/28/90
SAMPLE TIME	1515	1615	1700

CONSTITUENT	ug/l	ug/l	ug/l
Ethylbenzene	<1.0	<1.0	<1.0
p-Xylene	<1.0	<1.0	<1.0
m-Xylene	<1.0	<1.0	<1.0
o-Xylene	<1.0	<1.0	<1.0
Styrene	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Isopropylbenzene	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Bromobenzene	<1.0	<1.0	<1.0
1,2,3-Trichloropropane	<1.0	<1.0	<1.0
n-Propylbenzene	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	2.8	<1.0
1,3,5-Trimethylbenzene	<1.0	<1.0	<1.0
4-Chlorotoluene	<1.0	<1.0	<1.0
tert-Butylbenzene	<1.0	<1.0	<1.0
1,2,4-Trimethylbenzene	<1.0	<1.0	<1.0
sec-Butylbenzene	<1.0	<1.0	<1.0
p-Isopropyltoluene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	1.8	<0.50
n-Butylbenzene	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	1.8	<1.0
1,2-Dibromo-3-Chloropropane	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	<1.0	<1.0	<1.0
Hexachlorobutadiene	<1.0	<1.0	<1.0
Naphthalene	<1.0	<1.0	<1.0
1,2,3-Trichlorobenzene	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0

REMARKS: Sample was properly
preserved and in specified
container. Sample was analyzed
in accordance with EPA method
524.2.

cc: Envirocon, Livingston

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PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

L-88-13

POTW

GEYSER
TRAILER
COLL

LAB NO.	90-23551	90-23552	90-23553
SAMPLE IDENTIFICATION	140101-534	140101-535	140101-536
SAMPLE SUBMITTED	08/30/90	08/30/90	08/30/90
DATE REPORTED	09/12/90	09/12/90	09/12/90
SAMPLE DATE	08/28/90	08/28/90	08/28/90
SAMPLE TIME	1535	1445	1500

CONSTITUENT	ug/l	ug/l	ug/l
Dichlorodifluoromethane	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Bromomethane	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
Trichlorofluoromethane	<1.0	<1.0	<1.0
1,1-Dichloroethene	<0.50	<0.50	<0.50
Methylene Chloride	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,1-Dichloroethane	<1.0	<1.0	<1.0
2,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	34	3.2	<1.0
Chloroform	<1.0	<1.0	<1.0
Bromochloromethane	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
Carbon Tetrachloride	<0.50	<0.50	<0.50
1,1-Dichloropropene	<1.0	<1.0	<1.0
Benzene	<0.50	<0.50	<0.50
1,2-Dichloroethane	<0.50	<0.50	<0.50
Trichloroethene	15	1.6	<0.50
1,2-Dichloropropane	<1.0	<1.0	<1.0
Bromodichloromethane	<1.0	<1.0	<1.0
Dibromomethane	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	77	40	<0.50
1,3-Dichloropropane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dibromoethane	<1.0	<1.0	<1.0
Chlorobenzene	3.7	<1.0	<1.0
1,1,1,2-Tetrachloroethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

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Page 2

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston/BN

LAB NO.	90-23551	90-23552	90-23553
SAMPLE IDENTIFICATION	140101-534	140101-535	140101-536
SAMPLE SUBMITTED	08/30/90	08/30/90	08/30/90
DATE REPORTED	09/12/90	09/12/90	09/12/90
SAMPLE DATE	08/28/90	08/28/90	08/28/90
SAMPLE TIME	1535	1445	1500

CONSTITUENT	ug/l	ug/l	ug/l
Ethylbenzene	<1.0	<1.0	<1.0
p-Xylene	<1.0	<1.0	<1.0
m-Xylene	<1.0	<1.0	<1.0
o-Xylene	<1.0	<1.0	<1.0
Styrene	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Isopropylbenzene	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Bromobenzene	<1.0	<1.0	<1.0
1,2,3-Trichloropropane	<1.0	<1.0	<1.0
n-Propylbenzene	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	<1.0	<1.0	<1.0
4-Chlorotoluene	<1.0	<1.0	<1.0
tert-Butylbenzene	<1.0	<1.0	<1.0
1,2,4-Trimethylbenzene	<1.0	<1.0	<1.0
sec-Butylbenzene	<1.0	<1.0	<1.0
p-Isopropyltoluene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
n-Butylbenzene	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,2-Dibromo-3-Chloropropane	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	<1.0	<1.0	<1.0
Hexachlorobutadiene	<1.0	<1.0	<1.0
Naphthalene	<1.0	<1.0	<1.0
1,2,3-Trichlorobenzene	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0

REMARKS: Sample was properly
preserved and in specified
container. Sample was analyzed
in accordance with EPA method
524.2.

cc: Envirocon, Livingston

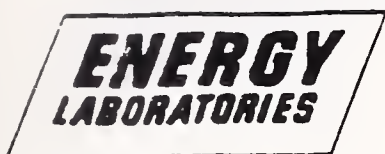
COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

L-88-13

POTW

Geiger
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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.	90-23548	90-23549	90-23550
SAMPLE IDENTIFICATION	140101-531	140101-532	140101-533
SAMPLE SUBMITTED	08/30/90	08/30/90	08/30/90
DATE REPORTED	09/12/90	09/12/90	09/12/90
SAMPLE DATE	08/28/90	08/28/90	08/28/90
SAMPLE TIME	1135	1315	1455

CONSTITUENT	ug/l	ug/l	ug/l
Dichlorodifluoromethane	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Bromomethane	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
Trichlorofluoromethane	<1.0	<1.0	<1.0
1,1-Dichloroethene	<0.50	<0.50	<0.50
Methylene Chloride	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,1-Dichloroethane	<1.0	<1.0	<1.0
2,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	1.8	2.1	14
Chloroform	<1.0	<1.0	<1.0
Bromochloromethane	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
Carbon Tetrachloride	<0.50	<0.50	<0.50
1,1-Dichloropropene	<1.0	<1.0	<1.0
Benzene	<0.50	<0.50	<0.50
1,2-Dichloroethane	<0.50	<0.50	<0.50
Trichloroethene	0.73	7.9	18
1,2-Dichloropropane	<1.0	<1.0	<1.0
Bromodichloromethane	<1.0	<1.0	<1.0
Dibromomethane	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	430	330	48
1,3-Dichloropropane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dibromoethane	<1.0	<1.0	<1.0
Chlorobenzene	<1.0	<1.0	<1.0
1,1,1,2-Tetrachloroethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

Page 2

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston/BN

	89-3	89-9	L-87-8
LAB NO.	90-23548	90-23549	90-23550
SAMPLE IDENTIFICATION	140101-531	140101-532	140101-533
SAMPLE SUBMITTED	08/30/90	08/30/90	08/30/90
DATE REPORTED	09/12/90	09/12/90	09/12/90
SAMPLE DATE	08/28/90	08/28/90	08/28/90
SAMPLE TIME	1135	1315	1455
CONSTITUENT	ug/l	ug/l	ug/l
Ethylbenzene	<1.0	<1.0	<1.0
p-Xylene	<1.0	<1.0	<1.0
m-Xylene	<1.0	<1.0	<1.0
o-Xylene	<1.0	<1.0	<1.0
Styrene	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Isopropylbenzene	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Bromobenzene	<1.0	<1.0	<1.0
1,2,3-Trichloropropane	<1.0	<1.0	<1.0
n-Propylbenzene	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	<1.0	<1.0	<1.0
4-Chlorotoluene	<1.0	<1.0	<1.0
tert-Butylbenzene	<1.0	<1.0	<1.0
1,2,4-Trimethylbenzene	<1.0	<1.0	<1.0
sec-Butylbenzene	<1.0	<1.0	<1.0
p-Isopropyltoluene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
n-Butylbenzene	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,2-Dibromo-3-Chloropropane	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	<1.0	<1.0	<1.0
Hexachlorobutadiene	<1.0	<1.0	<1.0
Naphthalene	<1.0	<1.0	<1.0
1,2,3-Trichlorobenzene	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0

REMARKS: Sample was properly
preserved and in specified
container. Sample was analyzed
in accordance with EPA method
524.2.

cc: Envirocon, Livingston

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.	90-23567	90-23568	90-23569
SAMPLE IDENTIFICATION	140101-526	140101-528	140101-529
SAMPLE SUBMITTED	08/30/90	08/30/90	08/30/90
DATE REPORTED	09/12/90	09/12/90	09/12/90
SAMPLE DATE	08/27/90	08/27/90	08/27/90
SAMPLE TIME	1645	1750	1855
CONSTITUENT	ug/l	ug/l	ug/l
Dichlorodifluoromethane	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Bromomethane	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
Trichlorofluoromethane	<1.0	<1.0	<1.0
1,1-Dichloroethene	<0.50	<0.50	<0.50
Methylene Chloride	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,1-Dichloroethane	<1.0	<1.0	<1.0
2,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0
Bromochloromethane	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
Carbon Tetrachloride	<0.50	<0.50	<0.50
1,1-Dichloropropene	<1.0	<1.0	<1.0
Benzene	<0.50	<0.50	<0.50
1,2-Dichloroethane	<0.50	<0.50	<0.50
Trichloroethene	<0.50	<0.50	<0.50
1,2-Dichloropropane	<1.0	<1.0	<1.0
Bromodichloromethane	<1.0	<1.0	<1.0
Dibromomethane	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	4.6	<0.50	<0.50
1,3-Dichloropropane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dibromoethane	<1.0	<1.0	<1.0
Chlorobenzene	<1.0	<1.0	<1.0
1,1,1,2-Tetrachloroethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston



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Page 2

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston/BN

LAB NO.	90-23567	90-23568	90-23569
SAMPLE IDENTIFICATION	140101-526	140101-528	140101-529
SAMPLE SUBMITTED	08/30/90	08/30/90	08/30/90
DATE REPORTED	09/12/90	09/12/90	09/12/90
SAMPLE DATE	08/27/90	08/27/90	08/27/90
SAMPLE TIME	1645	1750	1855

CONSTITUENT	ug/l	ug/l	ug/l
Ethylbenzene	<1.0	<1.0	<1.0
p-Xylene	<1.0	<1.0	<1.0
m-Xylene	<1.0	<1.0	<1.0
o-Xylene	<1.0	<1.0	<1.0
Styrene	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Isopropylbenzene	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Bromobenzene	<1.0	<1.0	<1.0
1,2,3-Trichloropropane	<1.0	<1.0	<1.0
n-Propylbenzene	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	<1.0	<1.0	<1.0
4-Chlorotoluene	<1.0	<1.0	<1.0
tert-Butylbenzene	<1.0	<1.0	<1.0
1,2,4-Trimethylbenzene	<1.0	<1.0	<1.0
sec-Butylbenzene	<1.0	<1.0	<1.0
p-Isopropyltoluene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
n-Butylbenzene	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,2-Dibromo-3-Chloropropane	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	<1.0	<1.0	<1.0
Hexachlorobutadiene	<1.0	<1.0	<1.0
Naphthalene	<1.0	<1.0	<1.0
1,2,3-Trichlorobenzene	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0

REMARKS: Sample was properly
preserved and in specified
container. Sample was analyzed
in accordance with EPA method
524.2.

cc: Envirocon, Livingston

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.	90-23564	90-23565	90-23566
SAMPLE IDENTIFICATION	140101-523	140101-524	140101-525
SAMPLE SUBMITTED	08/30/90	08/30/90	08/30/90
DATE REPORTED	09/12/90	09/12/90	09/12/90
SAMPLE DATE	08/27/90	08/27/90	08/27/90
SAMPLE TIME	1425	1525	1610
CONSTITUENT	ug/l	ug/l	ug/l
Dichlorodifluoromethane	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Bromomethane	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
Trichlorofluoromethane	<1.0	<1.0	<1.0
1,1-Dichloroethene	<0.50	<0.50	<0.50
Methylene Chloride	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,1-Dichloroethane	<1.0	<1.0	<1.0
2,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0
Bromochloromethane	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
Carbon Tetrachloride	<0.50	<0.50	<0.50
1,1-Dichloropropene	<1.0	<1.0	<1.0
Benzene	<0.50	<0.50	0.72
1,2-Dichloroethane	<0.50	<0.50	<0.50
Trichloroethene	<0.50	<0.50	<0.50
1,2-Dichloropropane	<1.0	<1.0	<1.0
Bromodichloromethane	<1.0	<1.0	<1.0
Dibromomethane	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	<0.50	<0.50	<0.50
1,3-Dichloropropane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dibromoethane	<1.0	<1.0	<1.0
Chlorobenzene	<1.0	<1.0	<1.0
1,1,1,2-Tetrachloroethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

Page 2

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston/BN

LAB NO.	90-23564	90-23565	90-23566
SAMPLE IDENTIFICATION	140101-523	140101-524	140101-525
SAMPLE SUBMITTED	08/30/90	08/30/90	08/30/90
DATE REPORTED	09/12/90	09/12/90	09/12/90
SAMPLE DATE	08/27/90	08/27/90	08/27/90
SAMPLE TIME	1425	1525	1610

CONSTITUENT	ug/l	ug/l	ug/l
Ethylbenzene	<1.0	<1.0	5.9
p-Xylene	<1.0	<1.0	<1.0
m-Xylene	<1.0	<1.0	<1.0
o-Xylene	<1.0	<1.0	1.0
Styrene	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Isopropylbenzene	<1.0	<1.0	5.2
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Bromobenzene	<1.0	<1.0	<1.0
1,2,3-Trichloropropane	<1.0	<1.0	<1.0
n-Propylbenzene	<1.0	<1.0	2.3
2-Chlorotoluene	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	<1.0	<1.0	<1.0
4-Chlorotoluene	<1.0	<1.0	<1.0
tert-Butylbenzene	<1.0	<1.0	<1.0
1,2,4-Trimethylbenzene	<1.0	<1.0	<1.0
sec-Butylbenzene	<1.0	<1.0	3.1
p-Isopropyltoluene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
n-Butylbenzene	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,2-Dibromo-3-Chloropropane	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	<1.0	<1.0	<1.0
Hexachlorobutadiene	<1.0	<1.0	<1.0
Naphthalene	<1.0	<1.0	17
1,2,3-Trichlorobenzene	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0

REMARKS: Sample was properly
preserved and in specified
container. Sample was analyzed
in accordance with EPA method
524.2.

cc: Envirocon, Livingston

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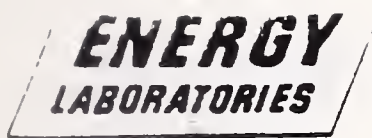
ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.	90-23561	90-23562	90-23563
SAMPLE IDENTIFICATION	140101-520	140101-521	140101-522
SAMPLE SUBMITTED	08/30/90	08/30/90	08/30/90
DATE REPORTED	09/12/90	09/12/90	09/12/90
SAMPLE DATE	08/27/90	08/27/90	08/27/90
SAMPLE TIME	1230	1315	1345
CONSTITUENT	ug/l	ug/l	ug/l
Dichlorodifluoromethane	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Bromomethane	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
Trichlorofluoromethane	<1.0	<1.0	<1.0
1,1-Dichloroethene	<0.50	<0.50	<0.50
Methylene Chloride	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,1-Dichloroethane	<1.0	<1.0	<1.0
2,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0
Bromochloromethane	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
Carbon Tetrachloride	<0.50	<0.50	<0.50
1,1-Dichloropropene	<1.0	<1.0	<1.0
Benzene	<0.50	<0.50	<0.50
1,2-Dichloroethane	<0.50	<0.50	<0.50
Trichloroethene	<0.50	<0.50	<0.50
1,2-Dichloropropane	<1.0	<1.0	<1.0
Bromodichloromethane	<1.0	<1.0	<1.0
Dibromomethane	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	<0.50	0.52	<0.50
1,3-Dichloropropane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dibromoethane	<1.0	<1.0	<1.0
Chlorobenzene	<1.0	<1.0	<1.0
1,1,1,2-Tetrachloroethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston



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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston/BN

LAB NO.	90-23561	90-23562	90-23563
SAMPLE IDENTIFICATION	140101-520	140101-521	140101-522
SAMPLE SUBMITTED	08/30/90	08/30/90	08/30/90
DATE REPORTED	09/12/90	09/12/90	09/12/90
SAMPLE DATE	08/27/90	08/27/90	08/27/90
SAMPLE TIME	1230	1315	1345

CONSTITUENT	ug/l	ug/l	ug/l
Ethylbenzene	<1.0	<1.0	<1.0
p-Xylene	<1.0	<1.0	<1.0
m-Xylene	<1.0	<1.0	<1.0
o-Xylene	<1.0	<1.0	<1.0
Styrene	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Isopropylbenzene	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Bromobenzene	<1.0	<1.0	<1.0
1,2,3-Trichloropropane	<1.0	<1.0	<1.0
n-Propylbenzene	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	<1.0	<1.0	<1.0
4-Chlorotoluene	<1.0	<1.0	<1.0
tert-Butylbenzene	<1.0	<1.0	<1.0
1,2,4-Trimethylbenzene	<1.0	<1.0	<1.0
sec-Butylbenzene	<1.0	<1.0	<1.0
p-Isopropyltoluene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
n-Butylbenzene	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,2-Dibromo-3-Chloropropane	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	<1.0	<1.0	<1.0
Hexachlorobutadiene	<1.0	<1.0	<1.0
Naphthalene	<1.0	<1.0	<1.0
1,2,3-Trichlorobenzene	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0

REMARKS: Sample was properly
preserved and in specified
container. Sample was analyzed
in accordance with EPA method
524.2.cc: Envirocon, Livingston
COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston / BN

LAB NO.	90-23570	Duplicate 90-23570
SAMPLE IDENTIFICATION	140101-519	140101-519
SAMPLE SUBMITTED	08/30/90	08/30/90
DATE REPORTED	09/12/90	09/12/90
SAMPLE DATE	08/27/90	08/27/90
SAMPLE TIME	1957	1957

CONSTITUENT	ug/l	ug/l
Dichlorodifluoromethane	<1.0	<1.0
Chloromethane	<1.0	<1.0
Vinyl chloride	<0.50	<0.50
Bromomethane	<1.0	<1.0
Chloroethane	<1.0	<1.0
Trichlorofluoromethane	<1.0	<1.0
1,1-Dichloroethene	<0.50	<0.50
Methylene Chloride	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0
1,1-Dichloroethane	<1.0	<1.0
2,2-Dichloropropane	<1.0	<1.0
cis-1,2-Dichloroethene	<1.0	<1.0
Chloroform	<1.0	<1.0
Bromochloromethane	<1.0	<1.0
1,1,1-Trichloroethane	<0.50	<0.50
Carbon Tetrachloride	<0.50	<0.50
1,1-Dichloropropene	<1.0	<1.0
Benzene	<0.50	<0.50
1,2-Dichloroethane	<0.50	<0.50
Trichloroethene	<0.50	<0.50
1,2-Dichloropropane	<1.0	<1.0
Bromodichloromethane	<1.0	<1.0
Dibromomethane	<1.0	<1.0
Toluene	<1.0	<1.0
1,1,2-Trichloroethane	<1.0	<1.0
Tetrachloroethene	<0.50	<0.50
1,3-Dichloropropane	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0
1,2-Dibromoethane	<1.0	<1.0
Chlorobenzene	<1.0	<1.0
1,1,1,2-Tetrachloroethane	<1.0	<1.0

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Water Analysis

PROJECT: Livingston/BN

		Duplicate
LAB NO.	90-23570	90-23570
SAMPLE IDENTIFICATION	140101-519	140101-519
SAMPLE SUBMITTED	08/30/90	08/30/90
DATE REPORTED	09/12/90	09/12/90
SAMPLE DATE	08/27/90	08/27/90
SAMPLE TIME	1957	1957

CONSTITUENT	ug/l	ug/l
Ethylbenzene	<1.0	<1.0
p-Xylene	<1.0	<1.0
m-Xylene	<1.0	<1.0
o-Xylene	<1.0	<1.0
Styrene	<1.0	<1.0
Bromoform	<1.0	<1.0
Isopropylbenzene	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0
Bromobenzene	<1.0	<1.0
1,2,3-Trichloropropane	<1.0	<1.0
n-Propylbenzene	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0
1,3,5-Trimethylbenzene	<1.0	<1.0
4-Chlorotoluene	<1.0	<1.0
tert-Butylbenzene	<1.0	<1.0
1,2,4-Trimethylbenzene	<1.0	<1.0
sec-Butylbenzene	<1.0	<1.0
p-Isopropyltoluene	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50
n-Butylbenzene	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0
1,2-Dibromo-3-Chloropropane	<1.0	<1.0
1,2,4-Trichlorobenzene	<1.0	<1.0
Hexachlorobutadiene	<1.0	<1.0
Naphthalene	<1.0	<1.0
1,2,3-Trichlorobenzene	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0

REMARKS: Sample was properly
preserved and in specified
container. Sample was analyzed
in accordance with EPA method
524.2.

cc: Envirocon, Livingston

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Quality Assurance - Spiked Analysis

PROJECT: Livingston / BN

Lab No. 90-23661 was spiked with the following constituents
with these results:

Constituent	Spike Amount	Range for	
	ug/l	P (%)	P (%)
1,1-Dichloroethene	50	100	80-120
Benzene	50	115	80-120
Trichloroethene	50	103	80-120
Toluene	50	113	80-120
Chlorobenzene	50	111	80-120

P = Percent recovery measured.

cc: Envirocon, Livingston

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

WATER VOLATILE SURROGATE RECOVERY

PROJECT: Livingston/BN

SAMPLE NO.	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #
90-23660	98	102	91
90-23661	102	98	96

	QC LIMITS
S1 (TOL) = Toluene-d8	(80-120)
S2 (BFB) = Bromofluorobenzene	(80-120)
S3 (DCE) = 1,2-Dichloroethane-d4	(80-120)

Column to be used to flag recovery values with an asterisk

* Values outside of contract required QC limits

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

WATER VOLATILE SURROGATE RECOVERY

PROJECT: Livingston/BN

SAMPLE NO.	S1	S2	S3
	(TOL)#	(BFB)#	(DCE)#
90-23672	109	105	106
90-23673	108	101	103
90-23674	100	97	114
90-23675	107	101	102
90-23676	103	99	96
90-23679	97	92	99

S1 (TOL) = Toluene-d8
S2 (BFB) = Bromofluorobenzene
S3 (DCE) = 1,2-Dichloroethane-d4

QC LIMITS
(80-120)
(80-120)
(80-120)

Column to be used to flag recovery values with an asterisk.

* Values outside of contract required QC limits.

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Quality Assurance-Spiked Analysis

PROJECT: Livingston / BN

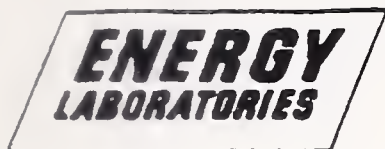
Lab No. 90-23671 was spiked with the following constituents
with these results.

Constituent	Spike Amount ug/l	P (%)	Range for P (%)
1,1-Dichloroethene	5.0	109	60-140
Benzene	5.0	115	60-140
Trichloroethene	5.0	108	60-140
Toluene	5.0	115	60-140
Chlorobenzene	5.0	112	60-140

P = Percent recovery measured.

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE



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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

WATER VOLATILE SURROGATE RECOVERY

PROJECT: Livingston/BN

SAMPLE NO.	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #
90-23663	99	89	106
90-23664	94	94	107
90-23665	93	94	106
90-23666	102	106	98
90-23667	94	94	99
90-23668	97	91	99
90-23669	96	94	85
90-23670	94	93	99
90-23671	92	97	102

S1 (TOL) = Toluene-d8	QC LIMITS
S2 (BFB) = Bromofluorobenzene	(80-120)
S3 (DCE) = 1,2-Dichloroethane-d4	(80-120)

Column to be used to flag recovery values with an asterisk.

* Values outside of contract required QC limits.

cc: Envirocon, Livingston

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

WATER VOLATILE SURROGATE RECOVERY

PROJECT: Livingston/BN

SAMPLE NO.	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #
90-23561	93	97	90
90-23562	98	94	100
90-23563	100	107	85
90-23564	96	98	102
90-23565	96	94	98
90-23566	95	105	106
90-23567	89	101	83
90-23568	92	105	85
90-23569	93	100	88
90-23570	93	100	88

S1 (TOL) = Toluene-d8	QC LIMITS
S2 (BFB) = Bromofluorobenzene	(80-120)
S3 (DCE) = 1,2-Dichloroethane-d4	(80-120)

Column to be used to flag recovery values with an asterisk

* Values outside of contract required QC limits

cc: Envirocon, Livingston

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

WATER VOLATILE SURROGATE RECOVERY

PROJECT: Livingston/BN

SAMPLE NO.	S1	S2	S3
	(TOL) #	(BFB) #	(DCE) #
90-23548	117	101	115
90-23549	109	92	102
90-23550	111	98	103
90-23551	102	90	96
90-23552	113	105	114
90-23553	97	101	97
90-23554	105	97	93
90-23555	108	100	97
90-23556	108	103	100
90-23557	102	91	85

	QC LIMITS
S1 (TOL) = Toluene-d8	(80-120)
S2 (BFB) = Bromofluorobenzene	(80-120)
S3 (DCE) = 1,2-Dichloroethane-d4	(80-120)

Column to be used to flag recovery values with an asterisk

* Values outside of contract required QC limits

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Quality Assurance-Spiked Analysis

PROJECT: Livingston / BN

Lab No. 90-23561 was spiked with the following constituents
with these results.

Constituent	Spike Amount ug/l	P (%)	Range for P (%)
1,1-Dichloroethene	5.0	100	60-140
Benzene	5.0	94	60-140
Trichloroethene	5.0	88	60-140
Toluene	5.0	106	60-140
Chlorobenzene	5.0	105	60-140

P = Percent recovery measured.



ENERGY LABORATORIES, INC.

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

Quality Assurance-Spiked Analysis

PROJECT: Livingston / BN

Lab No. 90-23551 was spiked with the following constituents with these results.

Constituent	Spike Amount ug/l	P (%)	Range for P (%)
1,1-Dichloroethene	5.0	106	60-140
Benzene	5.0	99	60-140
Trichloroethene	5.0	77	60-140
Toluene	5.0	107	60-140
Chlorobenzene	5.0	115	60-140

P = Percent recovery measured.

cc: Envirocon, Livingston

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

